

Characteristics, Expenditures, and Economic Impact of Resident and Nonresident Hunters and Anglers in North Dakota, 1996-97, Season and Trends

**Tina D. Lewis
Jay A. Leitch
Aaron J. Meyer**



**Department of Agricultural Economics • Agricultural Experiment Station
North Dakota State University • Fargo, ND 58105-5636**

Acknowledgments

Thanks are extended to the following individuals for reviewing this manuscript: Charlene Lucken, Tim Petry, Dr. Larry Leistritz, Dr. Steve Schultz, and Arlen Harmoning. An additional thanks is extended to Arlen Harmoning for his technical assistance and to the North Dakota Game and Fish Department and the North Dakota Agricultural Experiment Station for funding this project. Also, thank you to the many helpful individuals who completed the mail questionnaire.

We would be happy to provide a single copy of this publication free of charge. You can address your inquiry to: Carol Jensen, Department of Agricultural Economics, North Dakota State University, P.O. Box 5636, Fargo, ND, 58105-5636, Ph. 701-231-7441, Fax 701-231-7400, e-mail cjensen@ndsuxext.nodak.edu. This publication is also available electronically at this web site: <http://agecon.lib.umn.edu/ndsu.html>

NOTICE:

The analyses and views reported in this paper are those of the author. They are not necessarily endorsed by the Department of Agricultural Economics or by North Dakota State University.

North Dakota State University is committed to the policy that all persons shall have equal access to its programs, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

Information on other titles in this series may be obtained from: Department of Agricultural Economics, North Dakota State University, P.O. Box 5636, Fargo, ND 58105. Telephone: 701-231-7441, Fax: 701-231-7400, or e-mail: cjensen@ndsuxext.nodak.edu.

Copyright © 1998 by Tina D. Lewis, Jay A. Leitch, and Aaron J. Meyer. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Table of Contents

	<u>Page</u>
List of Tables	iii
List of Figures	v
Abstract	vi
Highlights	vii
Introduction	1
Procedures	2
Survey	2
Sample Groups and Sample Sizes	3
Survey Instruments	3
Mailings and Data Collection Problems	3
Response Rates	6
Expenditures	6
Confidence Intervals	8
Economic Impacts	8
Direct Impact	8
Indirect Impact	8
Ruralized Expenditures	9
Additional Expenditures	9
Resident and Nonresident Hunter/Angler Characteristics	9
Residents	9
Age	9
Residence	10
Income	12
Ownership of Land Hunted	12
Days of Participation	12
Distance Traveled	12
Value of a Day of Hunting/Angling	17
Nonresidents	18
Age	18
Residence	18
Income	18
Ownership of Land Hunted	20
Days of Participation	21
Distance Traveled	21
Value of a Day of Hunting/Angling	22

Table of Contents (Cont.)

	<u>Page</u>
Resident and Nonresident Hunter/Angler Expenditures	23
Daily and Season Expenditures	23
Projected Total Expenditures	29
Additional Nonresident Expenditures	34
Economic Impact of Resident and Nonresident Hunters/Anglers	35
Resident and Nonresident Ruralized Expenditures	35
Summary	37
Conclusions	38
References	41
Appendix A - Representative Questionnaire	43
Appendix B - Summary of Expenditures	47

List of Tables

<u>Table</u>	<u>Page</u>
1 Sample Groups and Mailings, North Dakota Hunter and Angler Survey, 1996-97	4
2 Sample Sizes, Undeliverables, Returns and Response Rates by Activity, North Dakota Resident and Nonresident Hunters and Anglers, 1996-97	5
3 Variable and Fixed Good Expenditure Categories	7
4 Average Age and Percentage of Resident Hunters/anglers in Each Age Group in North Dakota, by Activity, 1996-97	10
5 Residence of Resident North Dakota Hunters/anglers, by Activity, 1996-97	11
6 Incomes of Resident Hunters in North Dakota, by Activity, 1996-97	13
7 Resident Hunting by Land Type, by Activity, North Dakota, 1996-97	14
8 Average Days Residents Spent Hunting/fishing in North Dakota, by Activity, 1981, 1982, 1986, 1990, and 1996	15
9 Average Miles Traveled to Hunt/fish by North Dakota Residents, by Activity, 1981, 1982, 1986, 1990, and 1996	16
10 Average Value of a Day Spent Hunting/fishing in North Dakota, Estimated by Resident Respondents, by Activity, 1996 Dollars, 1981, 1982, 1986, 1990, and 1996	18
11 Average Age and Percentage of Nonresident Hunters/anglers in Each Age Group in North Dakota, by Activity, 1996-97	18
12 Residence of Nonresident North Dakota Hunters/anglers, by Activity, 1996	19
13 Average Incomes of Nonresident Hunters in North Dakota, by Activity, 1996-97	19
14 Nonresident Hunting by Land Type, by Activity, North Dakota, 1976, 1983, 1990, and 1996	20
15 Average Days Nonresidents Spent Hunting/fishing in North Dakota, by Activity, 1976, 1983, 1990, and 1996	21

List of Tables (Cont.)

<u>Table</u>	<u>Page</u>
16 Average Miles Traveled to Hunt/fish by Nonresidents in North Dakota, by Activity, 1976, 1983, 1990, and 1996	22
17 Average Value of a Day Spent Hunting/fishing in North Dakota, Estimated by Nonresident Respondents, by Activity, 1996 Dollars, 1983, 1990, and 1996	22
18 Average Season and Daily Expenditures, by Activity, Resident and Nonresident Hunter/angler Survey, 1996-97	24
19 Average Season and Daily Expenditures, by Activity, Resident Hunters and Anglers, 1996 Dollars, 1982, 1986, 1990, and 1996	25
20 Average Season Expenditures, by Activity, Nonresident Hunters and Anglers, 1996 Dollars, 1976, 1983, 1990, and 1996	29
21 License Sales, Active Participants, and Participation Rates, North Dakota Hunters and Anglers, 1996-97	30
22 Total Direct Resident and Nonresident Hunter/angler Expenditures in North Dakota, by Activity, 1996-97	31
23 Resident and Nonresident Total Direct Expenditures (Excluding License Fees) and Percentage Change, 1996 Dollars, Various Survey Years	33
24 Average Additional Expenditures per Hunter/angler and Additional Total Direct Expenditures for All Hunters/anglers, 1996-97	34
25 Average Additional Expenditures per Hunter/angler for all Nonresident Hunters/anglers, by Activity, 1996 Dollars, 1990 and 1996	34
26 Retail Trade, Personal Income, Total Business Activity, and Employment Generated by Resident and Nonresident Hunter/angler Expenditures in North Dakota, 1996-97	35
27 Urban Resident Hunter and Angler Expenditures in Rural Areas in North Dakota, by Activity, 1996-97	36
28 Nonresident Hunter and Angler Expenditures in Rural Areas in North Dakota, by Activity, 1996-97	37

List of Figures

<u>Figure</u>	<u>Page</u>
1 Resident average season expenditures, big game activity, from 1982 to 1996	26
2 Resident average season expenditures, small game activity, from 1982 to 1996	26
3 Resident average season expenditures, fishing activity, from 1982 to 1996	27
4 Resident average daily expenditures, big game activity, from 1982 to 1996	27
5 Resident average daily expenditures, small game activity, from 1982 to 1996	28
6 Resident average daily expenditures, fishing activity, from 1982 to 1996	28
7 Resident direct expenditures percentages, by activity for 1996-1997	32
8 Nonresident direct expenditures percentages, by activity for 1996-1997	32
9 Total direct resident and nonresident expenditures, by activity for 1996-1997	33
10 North Dakota Population, 1980-1996	39
11 Percentage of North Dakota population who are hunters/anglers, 1980-1996	39
12 North Dakota resident general game hunting/fishing license sales, 1980-1996	40
13 North Dakota nonresident general game hunting/fishing license sales, 1980-1996	40

Abstract

Wildlife-related recreation is an important source of economic activity in North Dakota. Using primary, survey-based data, the expenditures and economic impacts of hunters and anglers were summarized for the 1996 hunting/fishing seasons. Total resident and nonresident expenditures (including cost of licenses and additional nonresident expenditures not related to hunting/angling) came to \$594 million. Almost \$144 million of total expenditures was spent in rural areas by nonresidents and urban residents. Resident and nonresident hunters and anglers generated \$1.6 billion in total business activity, \$250 million in retail trade sales, \$393 million in personal income, and supported over 21,000 jobs. These results suggest that North Dakota's resident and nonresident hunters and anglers are a vital part of the state's economy.

Key Words: hunter, angler, expenditures, impact, North Dakota, nonresident

Highlights

Fish and wildlife-related recreational opportunities in North Dakota are provided by a variety of private businesses, state and federal agencies, and private landowners. Managers and policy-makers face the challenge of balancing the demand for hunting and angling activities with the supply of wildlife-related resources. The policies they are making regarding hunting and angling have an impact on the state's economy and rural communities. Therefore, the impacts from management policies on resident and nonresident hunters and anglers and on wildlife-related resources must be assessed and compared.

Mail questionnaires were distributed to a random sample of licensed hunters and anglers provided by the North Dakota Game and Fish Department (NDGF). Three license types were sampled which included: resident, nonresident, and gratis. Gratis license holders are landowners who are eligible for free licenses provided they own or lease a minimum of a quarter section of land (160 acres) and agree to hunt only on their own land. The land must also be owned or leased for agricultural purposes and actively farmed or ranched. The sample groups included 1996-97 season resident license holders for pronghorn antelope archery, pronghorn antelope firearms, special big game, deer archery, deer firearms, deer muzzleloader, furbearer, waterfowl, upland game, wild turkey (includes spring and early and late fall seasons), and open water and ice fishing. Sample groups also included 1996-97 season nonresident license holders for pronghorn archery, deer archery, deer firearms, small game, and fishing.

Resident open water anglers had the highest average season expenditures (\$2,779) of all resident hunting/angling activities. Resident archery antelope hunters had the highest average daily expenditure (\$450), while gratis fall wild turkey hunters had the lowest average daily (\$17) and season expenditures (\$50). The four activity groups of gratis hunters spent the least, both for the season and on a daily basis. Excluding them leaves fall turkey hunters spending the least for the season (\$418) and archery deer hunters spending the least on average per day (\$99).

Nonresident anglers had the highest season (\$1,122) expenditures and archery deer hunters the highest daily (\$150) expenditures of all nonresident hunters/anglers. Firearms deer hunters spent the least, on average over the nonresident season (\$466), and archery antelope hunters spent the least average per day (\$118).

Total direct resident and nonresident hunter/angler expenditures, excluding the cost of licenses and additional nonresident expenditures, came to \$578 million. Fifty-nine percent of the total direct expenditures came from the angling activities. Resident hunters/anglers spent 94 percent (\$543 million) of the total direct expenditures.

Total direct resident expenditures (excluding the cost of licenses) have increased from \$151 million in 1982 to \$543 million in 1996. Nonresident expenditures have increased from \$6 million in 1976 to \$35 million in 1996.

Resident and nonresident hunters and anglers generated \$1,668 million in total business activity in North Dakota in 1996. Their expenditures accounted for \$250 million in retail trade sales, and \$393 million in personal income and supported over 21,000 jobs.

Total resident and nonresident expenditures (excluding cost of licenses and additional nonresident expenditures) were \$578 million in 1996. Over \$117 million (22 percent) of total resident expenditures were ruralized. Over \$26 million (76 percent) of total nonresident expenditures were spent in rural areas. Twenty-five percent of total resident and nonresident expenditures were spent in rural areas by nonresidents and urban residents.

Characteristics, Expenditures, and Economic Impact of Resident and Nonresident Hunters and Anglers in North Dakota, 1996-97, Season and Trends

Tina D. Lewis, Jay A Leitch, and Aaron J. Meyer*

Introduction

Fish and wildlife-related recreational opportunities in North Dakota are provided by a variety of private businesses, state and federal agencies, and private landowners. Managers and policy-makers face the challenge of balancing the demand for hunting and angling activities with the supply of wildlife-related resources. The policies they make regarding hunting and angling have an impact on the state's economy and on rural communities. Therefore, the impacts from management policies on resident and nonresident hunters and anglers and on wildlife-related resources must be assessed and compared.

The purpose of this study was to estimate characteristics, expenditures, and economic impacts of resident and nonresident hunters and anglers for the 1996-97 season in North Dakota. Specific objectives were to

- 1) identify socioeconomic characteristics of resident and nonresident hunters and anglers;
- 2) estimate resident and nonresident hunters' and anglers' season and daily variable, fixed, and total expenditures;
- 3) estimate direct and indirect economic activity resulting from resident and nonresident hunter and angler expenditures;
- 4) estimate the extent of nonresident and urban resident hunter and angler expenditures in rural areas; and
- 5) identify changes in resident and nonresident characteristics, expenditures and economic impacts using time-series data.

The time-series data set for North Dakota's hunter and angler characteristics, expenditures, and economic impacts goes back to 1976, when nonresident expenditure data were collected (Leitch and Scott 1978). Nonresident expenditure data were also collected in 1983 (Anderson and Leitch 1984). Resident expenditure data were collected in 1981 (Leitch and Kerestes 1982), 1982 (Kerestes and Leitch 1983), and 1986 (Baltezore et al. 1987). Expenditure data for resident and nonresident hunters and anglers were collected in 1991 (Baltezore and Leitch 1992). Data from this study will be added to the time-series data set and compared with past survey data to identify changes in resident and nonresident characteristics, expenditures, and economic impacts.

*Research assistant, professor, and research assistant, respectively, Department of Agricultural Economics, North Dakota State University, Fargo.

Expenditures by nonresident hunters and anglers represent new money to the state. “New money” is essential for economic growth, especially for rural communities which depend on this money for economic development. The “new money” provided by nonresident hunters and anglers helps rural areas to diversify their economic bases and strengthen their economies.

Resident hunters’ expenditures are considered “new money” only when in-state recreation opportunities reduce resident out-of-state expenditures. This means that the availability of hunting and angling activities in North Dakota keeps resident expenditures within the state, rather than “leaking” it to nearby states where there are similar or substitute opportunities for recreation. Resident expenditures may be considered “new money” to communities, drawing hunters and anglers from different parts of the state.

Direct economic activity is the aggregate of resident and nonresident hunter and angler expenditures. Indirect economic activity is the secondary effect from the “responding” of initial expenditures. This “responding” is called the multiplier effect. It estimates how many times a dollar spent by hunters and anglers circulates through the economy. Indirect economic activity is measured by total business activity, personal income, and employment. Direct and indirect economic activity make up the gross economic impact on the state. This shows the portion of state economic activity that is directly attributable to the hunting and angling industry.

Ruralized expenditures are those purchases of goods and services by nonresidents and urban residents in rural areas (Baltezore and Leitch 1992). Rural areas in North Dakota provide habitat for fish and wildlife and supply most of the natural resource inputs necessary for hunting and angling activities. The level of ruralized expenditures helps to determine the role of hunting and angling as an economic development tool for rural North Dakota.

Recreational activities are an important source of income and revenue that benefits all citizens of the state. The positive economic impact on North Dakota’s communities created by these expenditures promotes economic growth, particularly for rural communities. They are part of an expanding recreation and tourism industry in North Dakota. In 1989, the recreation and tourism sector comprised 4 percent of the state’s economic base (Leistriz and Coon 1990). It has grown to 8 percent of the state’s economic base in 1995 (Coon et al. 1995). It was the fifth largest industry, in terms of contribution to the state’s economy, on average in North Dakota from 1985 to 1995.

Procedures

Various methods were used to administer surveys, estimate expenditures, determine confidence intervals, conduct significance tests, and measure economic impacts. Methods used in similar past studies were followed whenever possible and applicable for comparisons.

Survey

A mail questionnaire was distributed to a random sample of licensed hunters and anglers provided by the North Dakota Game and Fish Department (NDGF). Three license types were

included: resident, nonresident, and gratis. Landowners who hunt are eligible for free (gratis) licenses for some species provided they own or lease a minimum of a quarter section of land (160 acres) and agree to hunt only on their own land. The land must also be owned or leased for agricultural purposes and actively farmed or ranched.

Sample Groups and Sample Sizes

Most hunting and angling opportunities available in North Dakota during the 1996-97 season for both resident and nonresident hunters and anglers were represented by the sample groups (Table 1). Sample groups included 1996-97 season resident license holders for pronghorn antelope archery, pronghorn antelope firearms, special big game, deer archery, deer firearms, deer muzzleloader, furbearer, waterfowl, upland game, wild turkey (includes spring, and early and late fall seasons), and open water and ice fishing. Sample groups also included 1996-97 season nonresident license holders for pronghorn antelope archery, deer archery, deer firearms, small game, and fishing.

Sample sizes were determined in a manner which was consistent with the method presented in Kerestes and Leitch (1983) (Table 2). Since expenditure questionnaires were included with the annual NDGF post-season harvest survey, the sample sizes were based on expected nonresponse and on desired large samples for consistent harvest information.

Survey Instruments

Questionnaires were designed for each sample group.¹ Questionnaire format was similar to past surveys to provide for a time-series comparison. NDGF personnel reviewed the questionnaires to confirm that their objectives would be met, to provide suggestions for improvement, and to identify any typographical errors and omissions.

Mailings and Data Collection Problems

North Dakota State University (NDSU) personnel administered surveys for all sample groups for both questionnaire mailings. The NDGF provided envelopes for the first mailings with return address indicated. Resident and nonresident hunter names and addresses were given a questionnaire identification number sorted by zip code and printed directly on the questionnaire. Questionnaires were mailed in window envelopes with postage-paid return envelopes.

Initial mailings were sent first class, which are automatically forwarded by the post office. If the forwarding order had expired, the post office returned the questionnaire with the new address, if one was available. The new addresses were entered into the data base, and the questionnaire was immediately resent. All questionnaires were scheduled for mailing on the day after the appropriate hunting or fishing season ended (Table 1).

¹A representative questionnaire is included in Appendix A. Other questionnaires are available from Dr. Leitch, Department of Agricultural Economics, NDSU, Fargo.

Table 1. Sample Groups and Mailings, North Dakota Hunter and Angler Survey, 1996-97

Activity	First Mailing Date ^{a,b}	Second Mailing Date ^b
Spring Turkey	May 27, 1996	June 25, 1996
Summer Fishing - Resident	October 11, 1996	December 14, 1996
Bighorn Sheep	October 28, 1996	November 27, 1996
Pronghorn Firearms		
Resident	November 4, 1996	January 20, 1997
Gratis	November 4, 1996	January 20, 1997
Elk Unit E2	November 18, 1996	January 12, 1997
Wild Turkey - Early	November 22, 1996	January 20, 1997
Deer Firearms		
Resident	November 27, 1996	February 11, 1997
Gratis	November 27, 1996	February 11, 1997
Nonresident	November 27, 1996	February 11, 1997
Deer Muzzleloader	December 9, 1996	January 21, 1997
Elk Unit E1	December 18, 1996	February 3, 1997
Wild Turkey		
Late	December 20, 1996	February 1, 1997
Gratis	December 20, 1996	February 1, 1997
Moose	December 20, 1996	February 7, 1997
Upland Game - Resident	December 30, 1996	February 25, 1997
Waterfowl - Resident	December 30, 1996	February 30, 1997
Deer Archery - Resident	January 3, 1997	March 10, 1997
Small Game - Nonresident	January 15, 1997	April 20, 1997
Furbearers	March 24, 1997	May 6, 1997
Winter Fishing - Resident	March 24, 1997	May 6, 1997
Nonresident Fishing	March 24, 1997	May 6, 1997
Pronghorn Archery		
Resident	April 15, 1997	May 20, 1997
Nonresident	April 15, 1997	May 20, 1997
Deer Archery - Nonresident	March 15, 1997	April 20, 1997

^aTwo mailings were sent.

^bMost mailing dates are approximate.

Table 2. Sample Sizes, Undeliverables, Returns and Response Rates by Activity, North Dakota Resident and Nonresident Hunters and Anglers, 1996-97

Activity	Sample Size	Undelivered	Returned	Response Rate Percentages
<u>Resident</u>				
Antelope Archery	976	32	420	44
Antelope Firearms	1,607	5	1,084	68
Gratis Antelope Firearms	713	3	315	44
Deer Archery	2,211	72	971	45
Deer Firearms	1,310	3	566	43
Gratis Deer Firearms	87	0	35	40
Deer Muzzleloader	700	5	516	74
Special Big Game ^a	256	0	123	48
Waterfowl	1,999	37	714	36
Upland Game	1,999	45	776	40
Spring Turkey	1,345	7	991	74
Gratis Spring Turkey	87	1	70	81
Fall Turkey (Early and Late)	3,007	18	1,911	64
Gratis Fall Turkey	212	1	96	45
Open Water Fishing	6,999	152	2,611	38
Ice Fishing	6,998	531	2,563	40
Furbearers	5,438	150	2,088	39
<u>Nonresident</u>				
Nonresident Fishing	2,845	292	1,083	42
Antelope Archery	36	3	19	58
Deer Archery	663	13	411	63
Deer Firearms	628	1	432	69
Small Game	2,000	18	1,275	64

^aIncludes elk, moose, and bighorn sheep.

There was one follow-up mailing. As questionnaires were returned, the questionnaire identification number was entered into the data base. After about 1 month, names in the sample who had not responded were sent a second questionnaire. Second mailings were sent bulk rate.

Some mailings were sent later than planned. For some mailings, also, the time that elapsed between the first and second mailings was greater than originally intended. Having sent the first mailings late could have affected response by giving respondents time to forget certain expenditure information. Allowing too long to elapse between mailings may have caused noticeable differences in responses between the two mailings. Organizational problems encountered with the vendor led to bad records of mailing dates, so estimates were used.

Response Rates

After most respondents had returned their completed questionnaires, a final count was done, the number of undelivered surveys was counted, and response rates were calculated (Table 2).

Response rates were calculated as: $R = q_r / f_q - r_q$

where R = response rate,

q_r = number of questionnaires returned,

f_q = number of first mailing questionnaires, and

r_q = number of refusals and undelivered questionnaires.

Resident response rates ranged from 36 percent for waterfowl hunters to 81 percent for gratis spring turkey hunters. Nonresident response rates ranged from 42 percent for anglers to 69 percent for deer firearms hunters. The overall average response rate was 53 percent.

Expenditures

Hunters and anglers spend their money on two general types of goods: durable (fixed) and nondurable (variable) (Table 3). Nondurable goods are those that either can only be used once or are used up in a relatively short time. Expenditures for nondurable goods can be called variable expenditures since the amount spent depends on the amount of time spent hunting or angling. Durable goods are those that can be used more than once and for a relatively long time. Expenditures for durable goods are called fixed expenditures. They are not related to activity levels in the short term.

Variable and fixed expenditures, as well as total season and daily expenditures, were summarized for each activity (Appendix B). Average season variable and fixed expenditures were determined by summing the individual expenditure categories for each type of expenditure. Average total season expenditures were determined by adding variable and fixed expenditures for those hunters and anglers with both variable and fixed expenditures. Daily expenditures were estimated by dividing season variable, fixed, and total expenditures by the number of days spent hunting or angling.

Table 3. Variable and Fixed Good Expenditure Categories

Category	Description
Variable Expenditures	
Access	Fees paid to gain access to land or to launch boats
Ammunition	Cartridges, shot shells
Bait	Cost of live bait
Film	Film and film developing
Food	Food and beverages
Lodging	Hotel, motel...
Meat	Meat processing, packing, fish cleaning
Operating	Boat gas and oil, repairs and maintenance of equipment
Rentals	Boat, motor, fish house, or equipment rental
Taxidermy	Professional fees or materials for mounting fish, birds, or animals
Transportation	
Private	Gas, oil, repairs for vehicles on hunting/fishing trips
Commercial	Fares, vehicle rentals, charters
Veterinarian	Dog health care
Other	Anything used for hunting/fishing not included in above categories
Fixed Expenditures	
Arrows	Arrows
ATV	All terrain vehicles, snowmobiles, motorbikes
Binoculars	Binoculars, spotting scope...
Boat	Boats, motors, and trailers
Camping	Tents, stoves, camping equipment used while hunting/fishing
Clothing	Special clothing used primarily for hunting/fishing
Depth finder	Depth or fish finders
Dogs	Hunting dogs
Duck boat/decoys	Duck boats, decoys...
Fishing equipment	Rods, reels, tackle boxes, tackle...
Skinning Equipment	Stretchers, knives...
Traps	Traps, snares, trapping supplies (lures, scents) ...
Vehicles	Pickups, motor homes, or other vehicles bought primarily for hunting/fishing
Winter Fishing Equipment	Fish houses, heaters, ice augers ...
Weapons	Rifles, shotguns, bows, and accessories
Other	Game/predator calls, snowshoes, game bags, waders, and other accessories used for hunting/fishing

Confidence Intervals

Confidence intervals were constructed for season and daily variable, fixed, and total expenditures. A 90 percent confidence level ($\alpha = 0.05$) was chosen, and the interval was calculated using the following equation:

$$\bar{X} \pm 1.64 * (s/\sqrt{n})$$

where

\bar{X} is the mean value of the sample group,
1.64 is the t-value based on a two-tailed 90 percent confidence level,
s is the standard deviation of the sample mean, and
n is the number of observations in the sample.

A 90 percent confidence level implies that there is a 90 percent probability that the true population mean falls within the confidence interval. It was assumed to be sufficient for NDGF decision-making purposes.

Economic Impacts

Resident and nonresident hunting and angling economic impacts were assessed. Economic impacts were divided into direct and indirect impacts. The overall direct and indirect economic impacts were also determined by aggregating resident and nonresident season expenditures.

Direct Impact

The direct impact was computed as the total dollar value of resident and nonresident hunter and angler expenditures. Average season expenditures were multiplied by the number of hunters or anglers participating in each activity to find the total expenditure for that activity. License sales were multiplied by the percentage of survey respondents participating to find the number of active hunters and anglers. The total direct economic impact was estimated by summing the total season expenditures for each activity.

Indirect Impact

Indirect impacts were measured as the increase in economic activity generated from the respending of direct hunter/angler expenditures. They were measured for resident, nonresident, and all hunters and anglers. The North Dakota 18-Sector Input-Output Model was used to estimate these impacts (Coon et al. 1990). The model was updated with 1995 data (Coon et al. 1995). Indirect impacts were measured as changes in total business activity, retail trade sales, and employment.

Ruralized Expenditures

Urban resident and nonresident hunter and angler expenditures in rural areas were defined as ruralized expenditures. All respondents were asked to indicate the percentage of their season expenditure they spent in rural areas (communities under 2,500 population). The percentage of ruralized spending multiplied by the seasonal average expenditure of each activity was summed for all urban residents and nonresidents to give each group's amount of expenditure in rural areas. The number of active hunters and anglers was multiplied by the amount of expenditure in rural areas per person for each activity to determine the total ruralized expenditures.

Additional Expenditures

Nonresident hunters and anglers were asked to estimate any additional expenditures they made in North Dakota not directly related to hunting or angling activities. These might include expenditures on goods and services such as clothing, appliances, or furniture. These additional expenditures were **not** included in estimates of direct or indirect expenditures.

Resident and Nonresident Hunter/Angler Characteristics

Information on characteristics such as age, residence, and income were gathered from survey responses and summarized. Other characteristics, like participation days, distance traveled to hunting/angling areas throughout the season, and the ownership type of land hunted were also collected and summarized. These were done for both residents of North Dakota and nonresidents for the 1996-97 season. Some comparisons were made to past survey data. Spring turkey hunters were not asked to indicate their age, place of residence, or income categories.

Residents

The average resident hunter/angler is not quite 40 years old, lives in an urban area or slightly smaller community, and earns an annual gross income of over \$30,000. A summary of characteristics of resident hunters/anglers in North Dakota follows.

Age

In general, the majority of hunters and anglers in each activity fell into the 19 to 45 years of age category (Table 4). Archery hunters tend to be younger and hunters using gratis licenses (antelope, deer and turkey) tend to be older. Seventy-four percent of archery pronghorn antelope hunters were in the 19 to 45 years of age category, the most of any group. Excluding gratis hunters, the smallest percentage in that category was 50 percent, for ice anglers and fall wild turkey hunters.

Table 4. Average Age and Percentage of Resident Hunters/anglers in Each Age Group in North Dakota, by Activity, 1996-97

Activity	Average Age	18 Years or Less	19 to 45 Years	46 to 65 Years	Over 65 Years
----- percentage-----					
Pronghorn Antelope					
Archery	34	9	74	16	1
Gratis	46	7	43	38	12
Firearms	40	7	60	29	4
Special Big Game	40	8	59	27	6
Deer					
Archery	36	11	67	20	2
Firearms	40	7	59	30	4
Gratis	48	6	42	33	18
Muzzleloader	43	4	61	31	3
Furbearer	41	4	64	29	4
Small Game					
Waterfowl	42	6	55	32	7
Upland	41	6	57	30	7
Turkey					
Fall Turkey	40	14	50	30	6
Fall (Gratis)	48	7	37	38	18
Fishing					
Open Water	--	2	52	30	15
Ice	—	2	50	30	18

Residence

Fall wild turkey hunters had the highest percentage of urban participants at 61 percent (Table 5). Excluding gratis hunters which are almost entirely rural, special big game hunters had the highest percentage of rural participants at 61 percent; however, this group is small and could also include some landowner-only licenses. The firearms and muzzleloader deer hunters tended to be more rural and more than half of resident anglers and furbearers respondents resided in rural areas.

The data are similar to the 1990 study (Baltezare and Leitch 1992), but the North Dakota populations trend seems to be towards more urban. The most noticeable changes occurred with pronghorns and furbearers. Furbearers and firearms pronghorns hunters tended to be more urban in 1996-97, except for archery pronghorn hunters which tended to be more rural.

Table 5. Residence of Resident North Dakota Hunters/anglers, by Activity, 1996-97

Activity	Urban			Rural			
	City over 50,000	City 2,500 to 50,000	Total Urban	Community under 2,500	Farm or Ranch	Rural Nonfarm	Total Rural
----- percentage-----							
Pronghorn Antelope							
Archery	17	42	58	19	14	8	42
Firearms	24	33	57	19	12	11	43
Gratis	3	5	8	13	74	5	92
Deer							
Archery	24	29	53	21	13	13	47
Firearms	17	31	47	22	17	13	53
Gratis		17	17		74	9	83
Muzzleloader	22	22	44	22	22	12	56
Special Big Game	8	31	39	31	20	9	61
Small Game							
Waterfowl	26	27	53	24	14	9	47
Upland	27	26	54	22	15	9	46
Wild Turkey							
Fall Turkey	26	35	61	17	12	10	39
Fall (Gratis)	3	5	8	6	85	2	92
Furbearer	23	25	48	23	19	11	52
Fishing							
Open Water	16	31	48	23	18	12	52
Ice	16	33	50	22	16	12	50

Income

All 13 resident hunting activities showed a large percentage of their participants (≥ 30 percent) earned \$50,000 or more in gross annual household income compared to the 8 lower income categories (Table 6). In the \$50,000 or more income category, all gratis hunters and fall wild turkey hunters averaged the highest percentage (about 40 percent), and archery and firearms deer hunters averaged the lowest percentage (about 30 percent). Anglers were not asked to indicate their income category. The income questions was not included on previous surveys so comparisons over time were not made.

Ownership of Land Hunted

Overall, the hunting by residents in the state was on private land. Excluding gratis hunters which are required to hunt on their own land, 83 percent of furbearer activity occurred on private land in the 1996-97 season (Table 7). Just over 50 percent of archery pronghorn antelope hunters hunted on private land, the lowest percentage of all resident hunting activities. Over 30 percent of archery pronghorn antelope hunting occurred on federal land, as was the case in 1990 (Baltezare and Leitch 1992).

Days of Participation

The average summer angler spent 17 days fishing during the 1996-97 season (Table 8). Furbearer hunters/trappers and archery deer hunters were the only two other participants who averaged more than 10 days. Fall wild turkey hunters (both resident and gratis) and firearms antelope hunters (both resident and gratis) had the lowest average days of participation (2 days).

Between 1981 and 1996, the average number of days participated stayed relatively stable for firearms antelope, firearms deer, muzzleloaders, special big game, spring and fall turkey hunting and ice fishing. The amount of time archery deer hunters spent hunting increased from 1990 to 1996, while the average participation days of furbearer hunters/trappers decreased from 1981 to 1982 and from that period on has remained stable. Archery antelope hunters increased from the early eighties to 1986 and decreased from 1990 to 1996. Small game hunters average days increased from the early eighties to 1990, but decreased in 1996. Open water fishing days decreased from the early eighties to 1986, and increased from 1990 to 1996.

Distance Traveled

Special big game hunters traveled the most, on average, of any other resident hunter/angler group in 1996 (970 miles) (Table 9). In contrast, the average gratis antelope hunter traveled the shortest distance (91 miles), and muzzleloader hunters, turkey hunters, and gratis hunters tended to travel fewer miles in comparison to the other hunting groups. For most hunter/angler groups, the average miles traveled per season increased from 1981 to 1990. However, the average miles traveled per season leveled off or decreased from 1990 to 1996. An exception was furbearer respondents who still traveled less miles on average in 1996 than reported in 1981.

Table 6. Incomes of Resident Hunters in North Dakota, by Activity, 1996-97

Activity	\$50,000 or more	\$40,000- \$49,999	\$30,000- \$39,999	\$25,000- \$29,999	\$20,000- \$24,999	\$15,000- \$19,999	\$10,000- \$14,999	\$5,000- \$9,999	Under \$5,000
	----- percentage -----								
Pronghorn Antelope									
Archery	37	16	17	9	6	7	4	2	2
Firearms	34	17	19	9	10	5	2	2	3
Gratis	41	9	13	8	10	7	4	3	6
Deer									
Archery	30	16	19	10	9	5	4	3	4
Firearms	29	16	20	10	9	6	4	2	3
Gratis	41	14	10	17	7	7			3
Muzzleloader	34	16	21	9	9	5	3	1	3
Special Big Game	33	19	20	6	7	8	3	2	3
Small Game									
Waterfowl	37	16	17	9	7	4	5	2	3
Upland	36	16	15	9	8	5	5	3	4
Wild Turkey									
Fall Turkey	39	16	15	9	8	5	3	2	4
Fall (Gratis)	41	16	8	7	14	7	5		3
Furbearer	36	17	20	8	7	5	3	2	2

Table 7. Resident Hunting by Land Type, by Activity, North Dakota, 1996-97

Activity	Land Type			
	Federal	State	Private	Unknown
	----- percentage-----			
Pronghorn Antelope				
Archery	33	10	53	4
Firearms	22	9	65	4
Gratis	1	0	97	2
Special Big Game	11	20	67	1
Deer				
Archery	13	13	72	2
Firearms	9	7	81	4
Gratis	0	0	94	6
Muzzleloader	8	10	81	1
Furbearer	6	6	83	4
Small Game				
Waterfowl	8	9	80	3
Upland	8	10	78	4
Wild Turkey				
Combined ^a	9	7	82	2
Fall Gratis	1	0	99	0
Spring	11	14	64	11
Spring Gratis	0	2	73	24

^aIncludes early and late fall seasons.

Table 8. Average Days Residents Spent Hunting/fishing in North Dakota, by Activity, 1981, 1982, 1986, 1990, and 1996

Activity	1981	1982	1986	1990	1996
----- days -----					
Pronghorn Antelope					
Archery	NA	4	7	8	6
Firearms	NA	2	2	2 ^a	2
Gratis	NA	NA	NA	--	2
Deer					
Archery	13	14	13	14	16
Firearms	4	4	5	4 ^a	4
Gratis	NA	NA	NA	--	3
Muzzleloader	NA	NA	NA	4	3
Special Big Game	4	5	4	5	5
Small Game					
Waterfowl	7	6	8	11	8
Upland	6	5	9	13	8
Wild Turkey					
Combined ^b	2	2	2	2 ^a	2
Fall Gratis	NA	NA	NA	--	2
Spring	NA	NA	NA	3	3
Spring Gratis	NA	NA	NA	NA	4
Furbearer	17	12	12	12	13
Fishing					
Open Water	22	18	13	13	17
Ice	NA	NA	12	11	10

^aIncludes gratis hunters.

^bIncludes early and late fall seasons.

Table 9. Average Miles Traveled to Hunt/fish by North Dakota Residents, by Activity, 1981, 1982, 1986, 1990, and 1996

Activity	1981	1982	1986	1990	1996
----- miles -----					
Pronghorn Antelope					
Archery	NA	467	688	777	737
Firearms	NA	513	366	418 ^a	637
Gratis	NA	NA	NA	--	91
Deer					
Archery	437	164	465	654	674
Firearms	270	205	338	335 ^a	375
Gratis	NA	NA	NA	--	112
Muzzleloader	NA	NA	NA	247	215
Special Big Game	397	567	583	1,131	970
Small Game					
Waterfowl	476	NA	480	904	779
Upland	415	NA	521	869	878
Wild Turkey					
Combined ^{cb}	249	207	232	340 ^a	277
Fall Gratis	NA	NA	NA	--	128
Spring	NA	NA	NA	270	311
Spring Gratis	NA	NA	NA	NA	98
Furbearer	796	612	636	625	694
Fishing					
Open Water	NA	103	649	860	815
Ice	NA	NA	651	672	495

^aIncludes gratis hunters.

^bIncludes early and late fall seasons.

Value of a Day of Hunting/Angling

Special big game hunters valued their hunting day higher than any other resident hunter/angler (\$148) (Table 10). Ice fishing participants valued their fishing day at \$33 per day, the lowest of any resident hunter/angler. Most values were under \$100 for each activity. There appears to be a lot of variability in the average value of a day reported by the various activity groups during the period 1981 to 1996. The general trend has been a decreasing average value of a day, particularly for deer and antelope (both archery and firearms), special big game, furbearers and ice fishing. A second group including small game, turkey and open water fishing increased from the early eighties to 1986, then decreased in 1990 and either stabilized or increased by 1996.

Table 10. Average Value of a Day Spent Hunting/fishing in North Dakota, Estimated by Resident Respondents, by Activity, 1996 Dollars, 1981, 1982, 1986, 1990, and 1996

Activity	1981	1982	1986	1990	1996
----- 1996 dollars -----					
Pronghorn Antelope					
Archery	NA	NA	74	65	69
Firearms	NA	NA	NA	110 ^a	96
Gratis	NA	NA	NA	--	64
Deer					
Archery	768	NA	64	61	46
Firearms	186	NA	79	69 ^a	52
Gratis	NA	NA	NA	--	36
Muzzleloader	NA	NA	NA	384	55
Special Big Game	1308	523	388	144	148
Small Game					
Waterfowl	69	NA	99	67	52
Upland	69	NA	109	50	61
Wild Turkey					
Combined ^b	178	NA	285	58 ^a	57
Fall Gratis	NA	NA	NA	--	34
Spring	NA	NA	NA	65	128
Spring Gratis	NA	NA	NA	NA	49
Furbearer	183	148	67	66	41
Fishing					
Open Water	79	NA	498	49	122
Ice	NA	NA	50	44	33

^aIncludes gratis hunters.

^bIncludes early and late fall seasons.

Nonresidents

The average nonresident hunter/angler in North Dakota is in his mid-40s, lives in an urban community, and has an annual gross income of over \$40,000.

Age

The majority of nonresident hunters and anglers fell into the age category of 19 to 45 years (Table 11). The largest percentage in that category was archery pronghorn antelope hunters (78 percent), and the smallest percentage was for nonresident anglers (41 percent).

Table 11. Average Age and Percentage of Nonresident Hunters/anglers in Each Age Group in North Dakota, by Activity, 1996-97

Activity	Average Age	18 Years or Less	19 to 45 Years	46 to 65 Years	Over 65 Years
----- percentage-----					
Pronghorn Antelope					
Archery	38	0	78	22	0
Deer					
Archery	41	2	69	28	1
Firearms	44	2	55	38	5
Small Game	46	2	50	41	8
Fishing	--	1	41	40	18

Residence

Firearms deer hunters had the highest percentage of urban participants (79 percent) (Table 12). At 47 percent, archery deer hunters had the highest percentage of rural participants. All nonresident hunting/angling groups indicated a majority of participants coming from urban areas.

Income

A majority of hunters in each nonresident hunting activity, except archery antelope hunting, reported having an annual gross household income of more than \$50,000 (Table 13). In the \$50,000 or more income category, small game hunters averaged the highest percentage of hunters at 62 percent. Archery pronghorn antelope hunters averaged the lowest percentage of hunters in the category at 42 percent.

Table 12. Residence of Nonresident North Dakota Hunters/anglers, by Activity, 1996

Activity	Urban			Rural			
	City over 50,000	City 2,500 to 50,000	Total Urban	Community under 2,500	Farm or Ranch	Rural Nonfarm	Total Rural
----- percentage -----							
Pronghorn Antelope							
Archery	21	37	58	5	16	21	42
Deer							
Archery	19	34	53	15	9	24	47
Firearms	42	36	79	7	3	12	21
Small Game	36	32	68	13	4	15	32
Fishing	31	32	62	14	8	15	38

Table 13. Average Incomes of Nonresident Hunters in North Dakota, by Activity, 1996-97

Activity	\$50,000 or more	\$40,000- \$49,999	\$30,000- \$39,999	\$25,000- \$29,999	\$20,000- \$24,999	\$15,000- \$19,999	\$10,000- \$14,999	\$5,000- \$9,999	Under \$5,000
	----- percentage -----								
Pronghorn Antelope									
Archery	42	26	16	5	11	0	0	0	0
Deer									
Archery	53	20	14	7	3	1	1	0	0
Firearms	59	15	13	6	4	1	1	0	0
Small Game	62	14	10	7	3	2	1	0	0

Ownership of Land Hunted

Over 80 percent of nonresident deer firearms hunting occurred on private land in the 1996-97 season (Table 14). Archery pronghorn antelope hunters and archery deer hunters had the lowest percentages of hunting on private land for all nonresident hunters at 71 percent. Overall, the majority of nonresident hunters hunted on private land. Twenty-one percent of archery deer hunters hunted on federal land.

The proportion of small game hunting that occurred on the land ownership categories measured changed little from 1976 to 1996 (Table 14). During that same time period firearms and archery deer hunters tended to use private land slightly more in 1976 and 1996, however, the 1990 data showed a drastic increase in public land use, particularly federally-owned.

Table 14. Nonresident Hunting by Land Type, by Activity, North Dakota, 1976, 1983, 1990, and 1996

Activity	1976	1983	1990	1996
----- percentage-----				
Pronghorn Antelope				
Archery				
Federal	14	NA	40	12
State	21	NA	10	17
Private	61	NA	47	71
Unknown	4	NA	3	1
Deer				
Archery				
Federal	18	19	25	21
State	25	19	14	7
Private	56	59	60	71
Unknown	1	3	1	1
Firearms				
Federal	11	12	8	6
State	9	7	9	7
Private	78	78	81	84
Unknown	2	3	2	3
Small Game				
Federal	12	12	10	10
State	12	9	11	13
Private	72	75	76	75
Unknown	4	4	3	3

Days of Participation

Nonresident anglers spent more days participating in their sport than any other nonresident hunting/angling group (9 days) (Table 15). Firearms deer hunters spent only 3 days, the least time of any nonresident group.

Between 1976 and 1996, participation days for most nonresident hunters/anglers did not change. Archery pronghorn antelope hunters experienced a decline in participation days over that time, from 9 days in 1976 to 6 days in 1996, while nonresident anglers showed a slight increase from 1990 (6 days) to 1996 (9 days).

Table 15. Average Days Nonresidents Spent Hunting/fishing in North Dakota, by Activity, 1976, 1983, 1990, and 1996

Activity	1976	1983	1990	1996
----- days -----				
Pronghorn Antelope				
Archery	9	NA	7	6
Deer				
Archery	7	8	8	7
Firearms	4	4	4	3
Small Game	5	4	5	6
Fishing	NA	8	6	9

Distance Traveled

Nonresident archery pronghorn antelope hunters traveled the farthest distance for all trips, more than any other nonresident group (1,897 miles) (Table 16). At 993 miles, firearms deer hunters traveled the shortest distance.

It is difficult to compare the miles traveled for the 1996-97 season with miles traveled data from past seasons in which one-way distance from respondents' homes to where they hunted or fished was requested. However, in 1990, archery pronghorn antelope and archery deer hunters were asked for miles traveled for all trips. In both these groups, total miles traveled increased from 1990 to 1996.

Table 16. Average Miles Traveled to Hunt/fish by Nonresidents in North Dakota, by Activity, 1976, 1983, 1990, and 1996

Activity	1976	1983	1990	1996
----- miles -----				
Pronghorn Antelope				
Archery	535	NA	1,529 ^a	1897 ^a
Deer				
Archery	373	502	1,169 ^a	1357 ^a
Firearms	588	639	567	993 ^a
Small Game	482	701	610	1369 ^a
Fishing	NA	696	489	1047 ^a

^aMiles traveled for all trips rather than just the one-way distance from the respondents' homes to where they hunted.

Value of a Day Hunting/Angling

The most any nonresidents valued a single hunting or angling day was, on average, \$101 by both firearms and archery deer hunters (Table 17). The least an average day was valued was \$64 by archery pronghorn antelope hunters. In general, between 1983 and 1996, nonresident hunters and anglers estimates of a hunting/fishing day's value decreased. The four groups surveyed in all three years showed a marked decrease from 1983 to 1990 with increases in 1996.

Table 17. Average Value of a Day Spent Hunting/fishing in North Dakota, Estimated by Nonresident Respondents, by Activity, 1996 Dollars, 1983, 1990, and 1996

Activity	1983	1990	1996
----- 1996 dollars -----			
Pronghorn Antelope			
Archery	NA	86	64
Deer			
Archery	150	72	101
Firearms	178	97	101
Small Game	151	84	91
Fishing	145	59	83

Resident and Nonresident Hunter/Angler Expenditures

Average daily and season total expenditures and projected total expenditures for the population were estimated for each resident and nonresident activity. Resident and nonresident projected total expenditures in the 1996 season were compared to those from previous survey years to identify changes in expenditure patterns over time. Nonresident additional expenditures not related to hunting and angling expenditures were also summarized.

Daily and Season Expenditures

Resident average daily expenditures ranged from \$17 for gratis fall wild turkey hunters to \$450 for archery antelope hunters (Table 18). Resident average season expenditures ranged from \$50 for gratis fall wild turkey hunters to \$2,779 for summer anglers (Appendix B).

The four activity groups of gratis hunters spent the least, both for the season and on a daily basis. Excluding them leaves fall turkey hunters spending the least for the season (\$418) and archery deer hunters spending the least for average daily expenditures (\$99). Nonresident average daily expenditures ranged from \$118 for archery antelope hunters to \$150 for archery deer. Anglers had the highest seasonal expenditures of \$1,122 compared to the rest of the nonresident activities. Firearms deer hunters spent the least of all the nonresidents over the season (\$466).

From 1982 to 1986, resident average season expenditures increased for all activities, except furbearer hunters/trappers (Table 19). From 1986 to 1990, resident average season expenditures went down, in general, except for waterfowl, gratis wild turkey, furbearer, and open water and ice fishing categories (Figures 2 and 3). Between 1990 and 1996, the average season expenditures for residents increased for half of the activities and decreased for the other half. Those that increased include archery pronghorn antelope, archery deer, gratis deer, muzzleloader deer, upland game, fall wild turkey, and spring turkey. Those that decreased include firearms pronghorn antelope, gratis antelope, firearms deer, special big game, waterfowl, gratis turkey, furbearer, and open water and ice fishing categories (Figures 1, 2, and 3).

Resident average daily expenditures were generally lower in 1990 compared to 1996 (Table 19). Gratis wild turkey, furbearer, and open water and ice fishing activities were exceptions (Figures 5 and 6). Half of the activities showed an increase in average daily expenditures from 1990 to 1996, and half showed a decrease. Those that increased include archery pronghorn antelope, gratis deer, muzzleloader deer, waterfowl, upland game, fall wild turkey, and spring wild turkey. Those that decreased include firearms pronghorn antelope, gratis antelope, archery deer, firearms deer, special big game, gratis wild turkey, furbearer, and open water and ice fishing (Figures 4, 5, and 6).

Nonresident average season expenditures were higher in 1976 than in 1983 for archery deer and firearms deer hunters and lower for small game hunters (Table 20). Between 1983 and 1990, average season expenditures went up for archery deer and small game hunters and for anglers. Over that same period, firearms deer hunters spent less per season, on average. Most activity groups averaged a higher season expenditure in 1996 than in 1990, with the exception of firearms deer hunters, whose average season expenditures continued to decrease.

Table 18. Average Season and Daily Expenditures, by Activity, Resident and Nonresident Hunter/angler Survey, 1996-97

Activity	Average Days	Expenditure			
		Season		Daily	
		Mean	C.I. ^a	Mean	C.I. ^a
-----dollars-----					
Residents					
Pronghorn Antelope					
Archery	6	1,777	±457	450	±195
Firearms	2	623	±137	387	±103
Gratis	2	117	±38	70	±24
Special Big Game	5	976	±261	325	±72
Deer					
Archery	16	1,270	±288	99	±24
Firearms	4	632	±187	174	±52
Muzzleloader	3	1,168	±454	442	±205
Gratis	3	201	±73	82	±35
Furbearer	13	1,215	±232	220	±69
Small Game					
Waterfowl	8	1,226	±417	193	±71
Upland	8	1,289	±277	246	±82
Wild Turkey					
Combined ^b	2	418	±116	263	±84
Fall Gratis	2	50	±22	17	±6
Spring	3	705	±304	359	±201
Spring Gratis	4	200	±117	48	±25
Fishing					
Open Water	17	2,779	±352	230	±35
Ice	10	1,011	±253	121	±39
Nonresidents					
Pronghorn Antelope					
Archery	6	685	±166	118	±32
Deer					
Archery	7	957	±262	150	±43
Firearms	3	466	±49	145	±14
Small Game	6	705	±55	131	±9
Fishing	9	1,122	±252	145	±35

^aIndicates a 90 percent confidence interval ($\alpha = 0.05$).

^bIncludes early and late fall seasons.

Table 19. Average Season and Daily Expenditures, by Activity, Resident Hunters and Anglers, 1996 Dollars, 1982, 1986, 1990, and 1996

Activity	Season				Daily			
	1982	1986	1990	1996	1982	1986	1990	1996
----- 1996 dollars ^a -----								
Pronghorn Antelope								
Archery	819	1,606	1,316	1,777	260	343	187	450
Firearms	651	864	672	623	431	683	390	387
Gratis	NA	769	334	117	NA	709	145	70
Deer								
Archery	326	1,035	848	1,270	35	97	100	99
Firearms	431	822	720	632	150	290	208	174
Muzzleloader	NA	NA	601	1,168	NA	NA	209	442
Gratis	NA	NA	166	201	NA	NA	50	82
Special Big Game	1,274	2,083	1,750	976	546	1,170	516	325
Small Game								
Waterfowl	281	827	1,345	1,226	47	120	116	193
Upland	247	1,168	852	1,289	46	248	76	246
Wild Turkey								
Combined ^b	84	651	187	418	46	489	101	263
Fall Gratis	NA	46	76	50	NA	22	31	17
Spring	NA	NA	320	705	NA	NA	218	359
Spring Gratis	NA	NA	NA	200	NA	NA	NA	48
Furbearer	898	894	1,251	1,215	NA	NA	250	220
Fishing								
Open Water	990	1,756	2,837	2,779	76	175	256	230
Ice	NA	378	1,047	1,011	NA	46	155	121

^aAdjusted to 1996 dollars, using the Consumer Price Index.

^bIncludes early and late fall, and winter seasons.

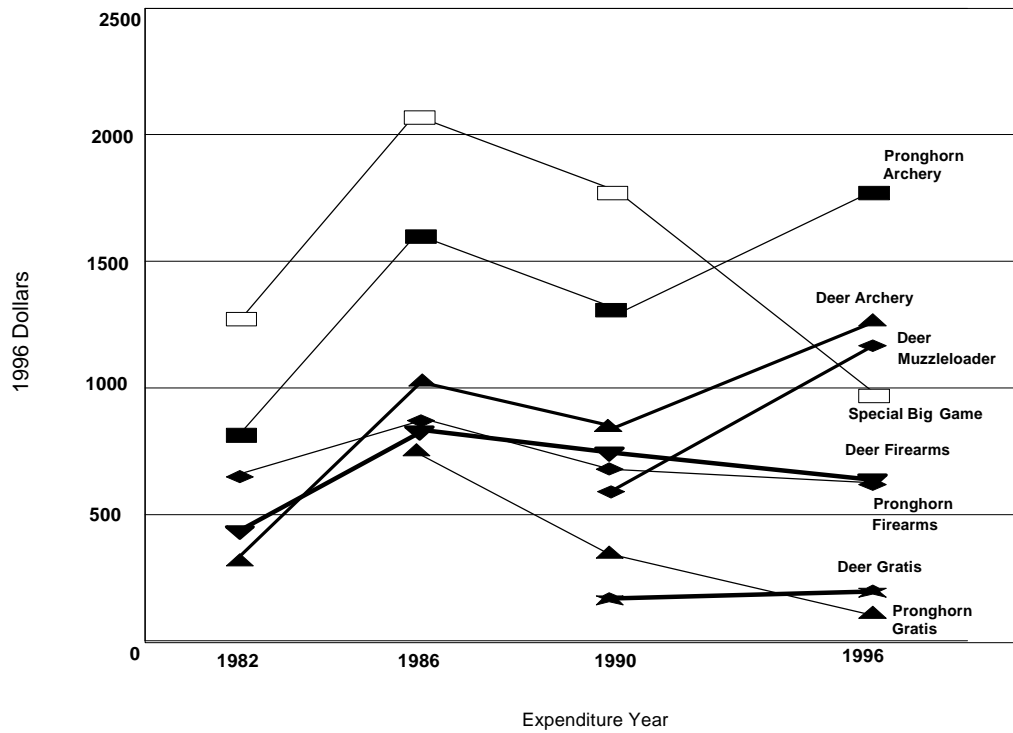


Figure 1. Resident average season expenditures, big game activity, from 1982 to 1996.

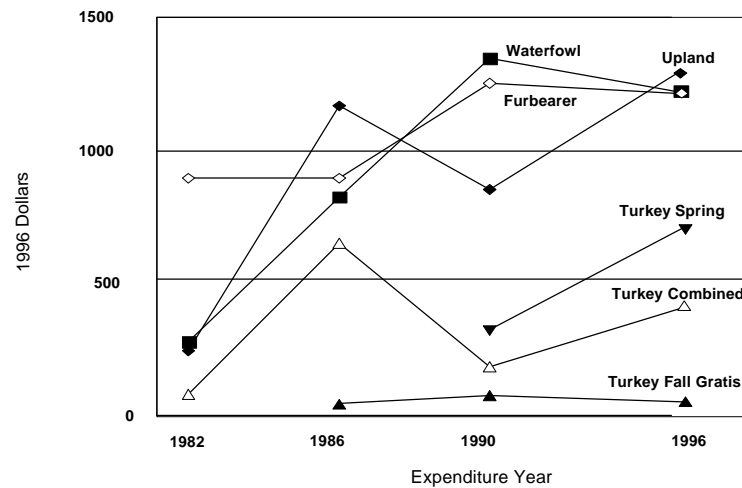


Figure 2. Resident average season expenditures, small game activity, from 1982 to 1996.

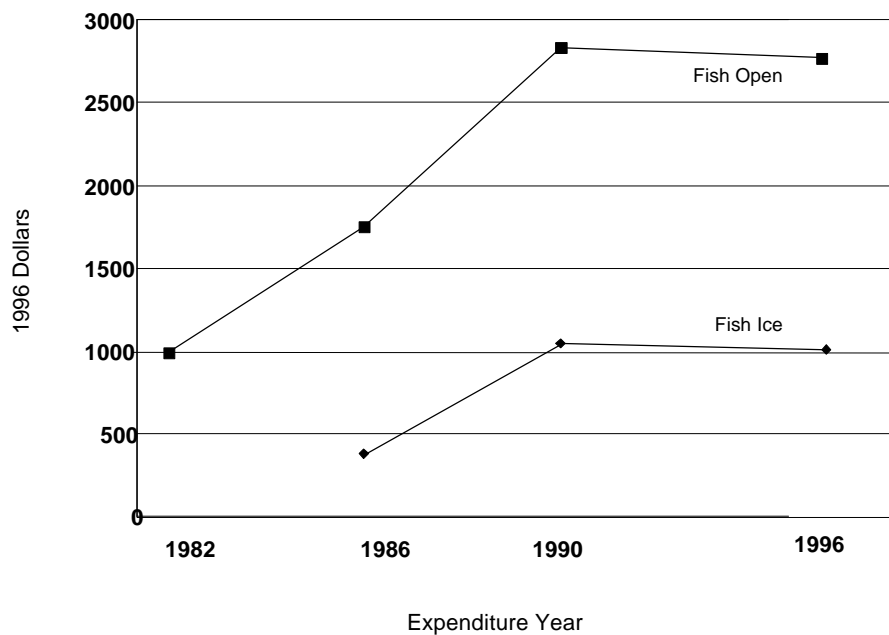


Figure 3. Resident average season expenditures, fishing activity, from 1982 to 1996.

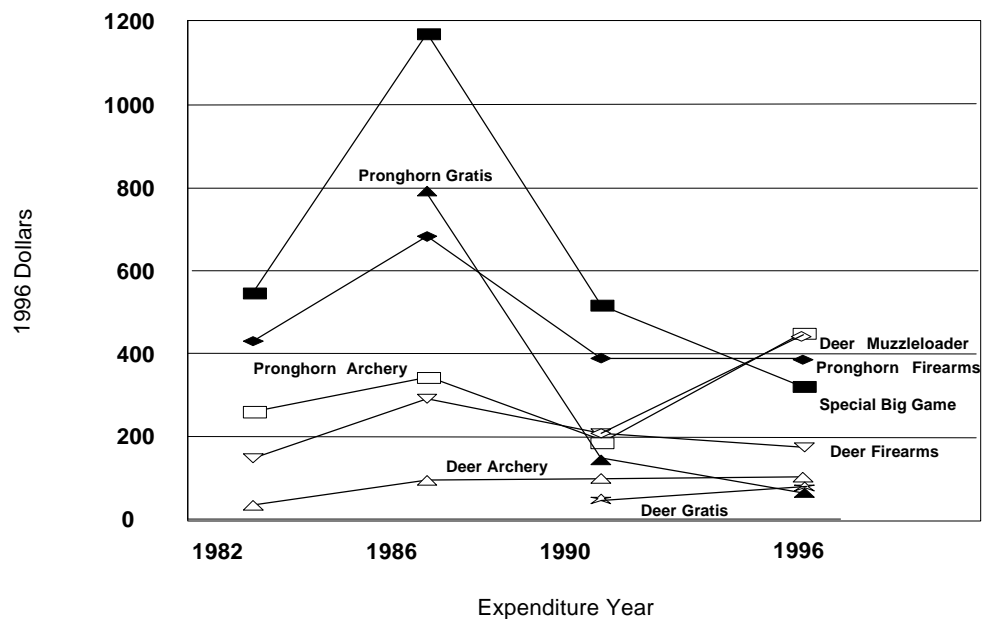


Figure 4. Resident average daily expenditures, big game activity, from 1982 to 1996.

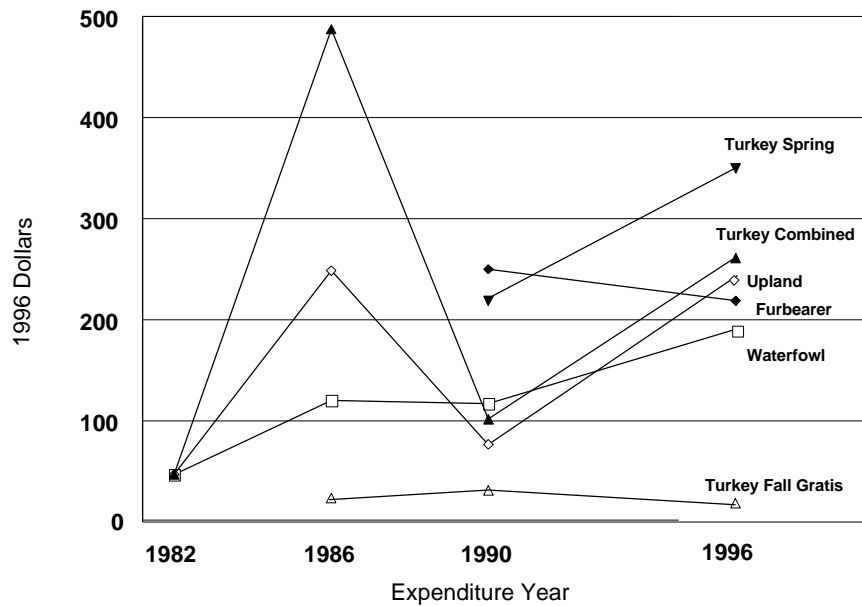


Figure 5. Resident average daily expenditures, small game activity, from 1982 to 1996.

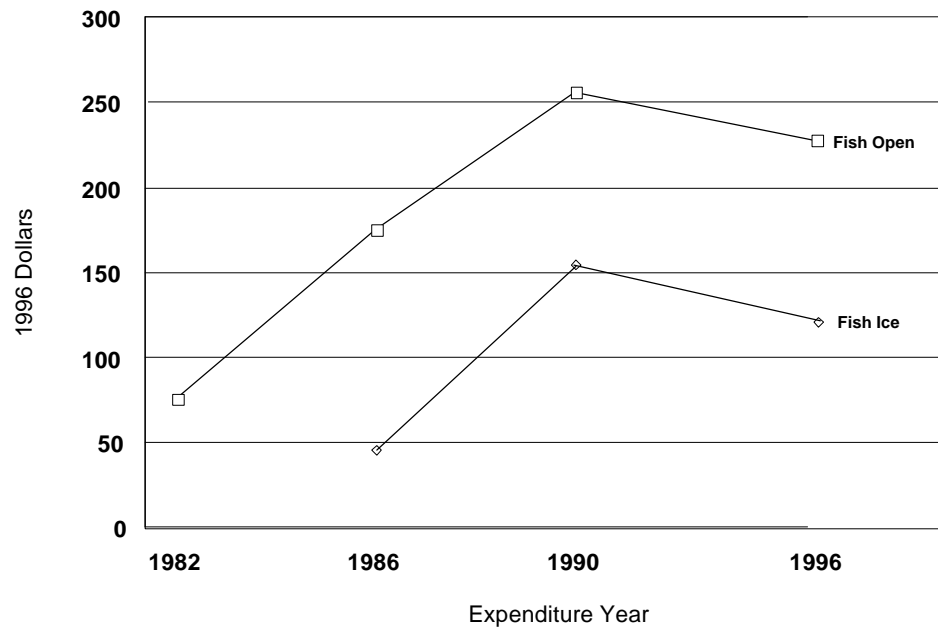


Figure 6. Resident average daily expenditures, fishing activity, from 1982 to 1996.

Table 20. Average Season Expenditures, by Activity, Nonresident Hunters and Anglers, 1996 Dollars, 1976, 1983, 1990, and 1996

Activity	Season			
	1976	1983	1990	1996
	----- 1996 dollars ^a -----			
Pronghorn Antelope				
Archery	NA	NA	442	685
Deer				
Archery	618	299	681	957
Firearms	618	576	559	466
Small Game	598	640	675	705
Fish	NA	677	802	1,122

^aAdjusted to 1996 dollars, using the Consumer Price Index.

Projected Total Expenditures

Total expenditures for each activity were contingent upon the number of licenses sold (Table 21), the participation rate (Table 21), and the average season expenditures (Table 18). For an estimate of the total direct economic impact that hunter/angler expenditures have on the North Dakota economy, total expenditures among individual activities and the cost of licenses were added together. Total expenditures were estimated for residents and nonresidents. Resident and nonresident total expenditures were added to get a total expenditure for hunters/anglers.

Total direct resident and nonresident hunter/angler expenditures during the 1996-97 seasons in North Dakota were \$583 million (Table 22). Excluding the cost of licenses, total expenditures were \$578 million. Only 21 percent of the resident expenditures can be attributed to small game (Figure 7), while 40 percent of nonresident expenditures was attributed to small game (Figure 8). Fifty-nine percent of total direct expenditures can be attributed to angling activities. Over 20 percent of total direct expenditures by hunters and anglers can be attributed to small game hunting in the state (Figure 9). Resident expenditures accounted for 94 percent (\$543 million) of the total direct expenditures.

Resident hunter/angler expenditures have increased from \$151 million in 1982 to \$543 million in 1996 (Table 23). Between 1990 and 1996, resident expenditures increased by 34 percent. Nonresident expenditures have increased from \$6 million in 1976 to \$35 million in 1996. From 1976 to 1983, nonresident expenditures increased by 194 percent. From 1983 to 1990, their expenditures decreased slightly, and rose again by 95 percent from 1990 to 1996.

Table 21. License Sales, Active Participants, and Participation Rates, North Dakota Hunters and Anglers, 1996-97

Activity	License Sales	Participation Rate	Active Participants ^a
----- percent-----			
RESIDENTS			
Pronghorn Antelope			
Archery	1,169	92.0	1,075
Firearms	1,607	95.5	1,535
Gratis	713	80.7	575
Special Big Game	256	97.6	250
Deer			
Archery	11,172	94.7	10,580
Firearms	86,226	98.4	84,846
Gratis	8,931	85.7	7,654
Muzzleloader	700	92.6	648
Furbearer	40,340	70.6	28,480
Small Game			
Waterfowl	60,714	63.5	38,553
Upland	60,714	84.0	51,000
Wild Turkey			
Combined ^b	3,007	81.8	2,460
Fall Gratis	234	64.2	150
Spring	1,335	89.6	1,196
Spring Gratis	110	71.0	78
Fishing			
Open Water	116,114	88.2	102,413
Ice	116,114	30.7	35,647
NONRESIDENTS			
Pronghorn Antelope			
Archery	83	100	83
Deer			
Archery	694	97.1	674
Firearms	932	97.5	909
Small Game	19,848	99.3	19,709
Fishing	18,123	98.0	17,761

^aNumber of active participants based on the percentage of survey respondents actually participating in each activity during the 1996-97 season.

^bIncludes early and late fall seasons.

Table 22. Total Direct Resident and Nonresident Hunter/angler Expenditures in North Dakota, by Activity, 1996-97

Activity	Resident		Nonresident		Total	
	Expenditure	Percentage	Expenditure	Percentage	Expenditure	Percentage
Pronghorn Antelope ^a	2,933,000 ^b	0.5	57,000	0.2	2,990,000	0.5
Deer ^b	69,321,000 ^c	12.8	1,068,000	3.1	70,389,000	12.2
Special Big Game	244,000	0.1	0	0.0	244,000	0.1
Small Game ^c	113,006,000	20.8	13,887,000	39.7	126,893,000	22.0
Wild Turkey ^d	1,896,000 ^e	0.3	0	0.0	1,896,000	0.3
Furbearer	34,589,000	6.4	0	0.0	34,589,000	6.0
Total Hunting	221,989,000	40.9	15,012,000	43.0	237,001,000	41.0
Hunting Percentage	93.7		6.3		100.0	
Total Fishing	320,680,000	59.1	19,925,000	57.0	340,605,000	59.0
Fishing Percentage	<u>94.1</u>	<u> </u>	<u>5.9</u>	<u> </u>	<u>100.0</u>	<u> </u>
Total Hunting and Fishing	542,669,000	100.0	34,937,000	100.0	577,606,000	100.0
Percentage	94.0		6.0		100.0	
Cost of Licenses	3,761,000		2,030,000		5,791,000	
Grand Total	546,430,000		36,967,000		583,397,000	

^aIncludes archery, firearms and gratis hunters.

^bIncludes archery, firearms, gratis and muzzleloader hunters.

^cIncludes upland game and waterfowl hunters.

^dIncludes gratis hunters, spring and fall seasons combined.

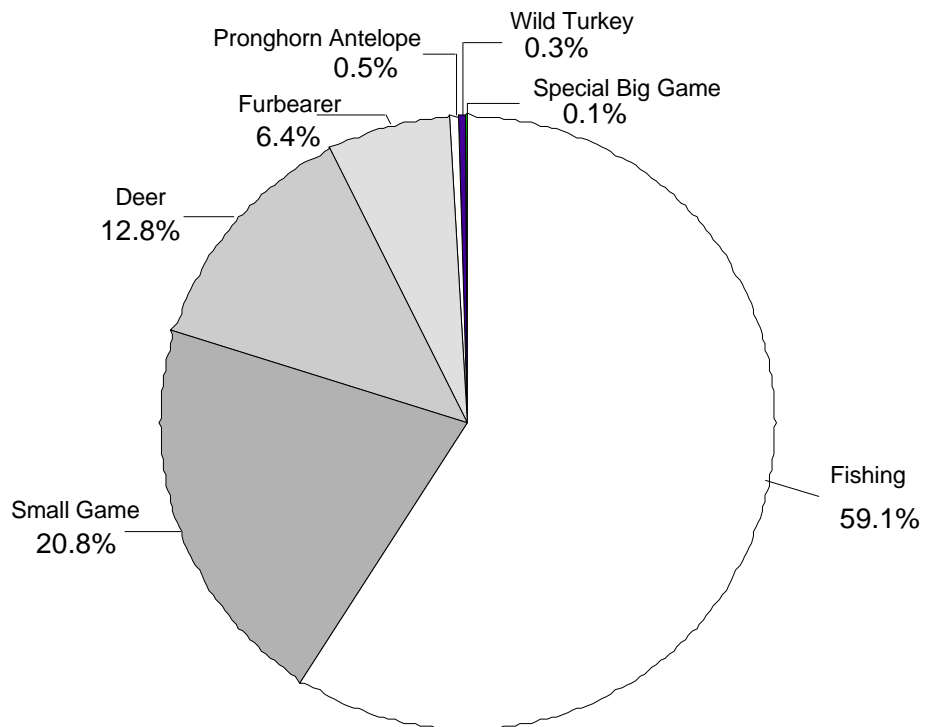


Figure 7. Resident direct expenditures percentages, by activity for 1996-1997.

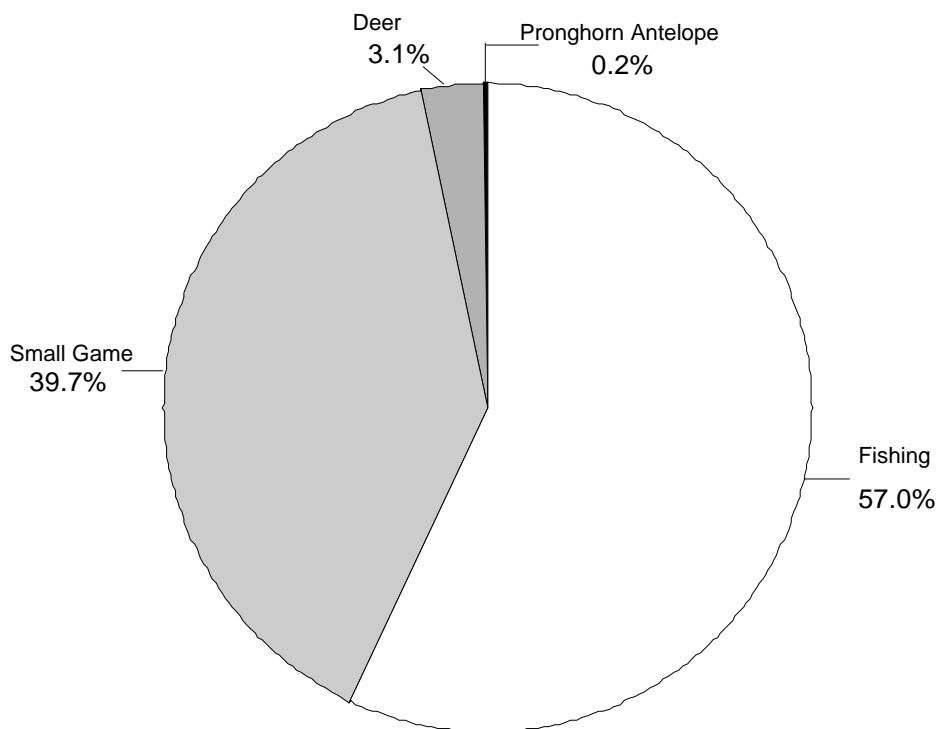


Figure 8. Nonresident direct expenditures percentages, by activity for 1996-1997.

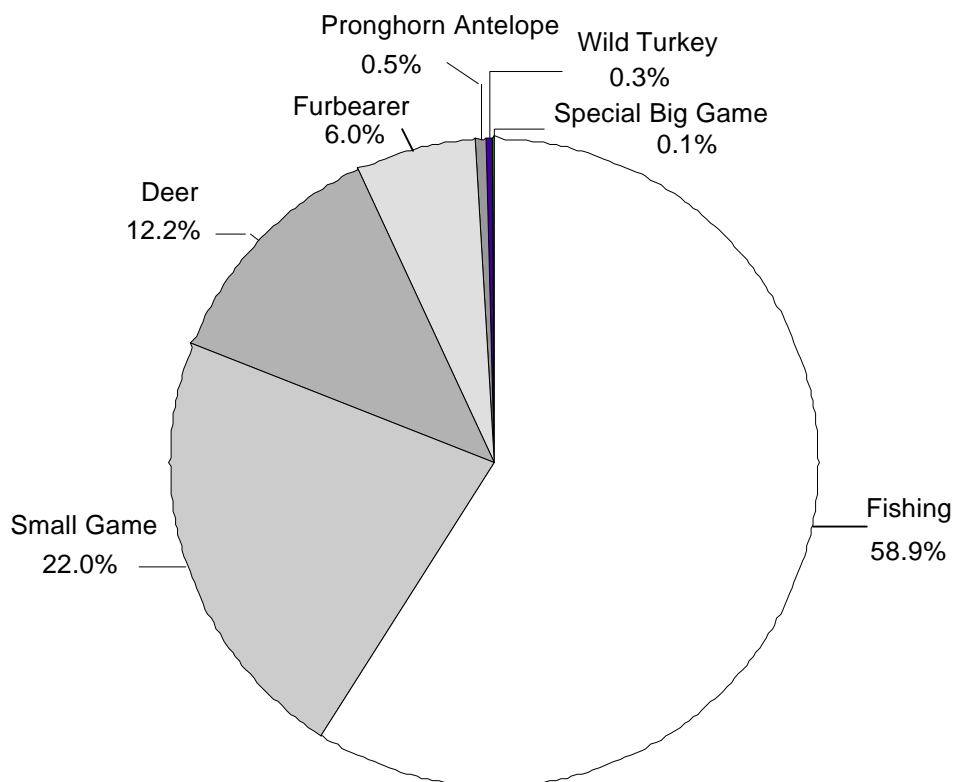


Figure 9. Total direct resident and nonresident expenditures, by activity for 1996-1997.

Table 23. Resident and Nonresident Total Direct Expenditures (Excluding License Fees) and Percentage Change, 1996 Dollars, Various Survey Years

Survey Year	Residents		Nonresidents	
	Total	Percent Change ^a	Total	Percent Change ^a
	- 1996 dollars ^b -		- 1996 dollars ^b -	
1976	NA	NA	6,317,416	NA
1982	150,612,160	NA	NA	NA
1983	NA	NA	18,565,532	194
1986	428,378,520	184	NA	NA
1990	403,998,710	(6)	17,956,557	(3)
1996	542,669,000	34	34,937,000	95

^aRepresents the percentage change from the previous survey year.

^bAdjusted to 1996 dollars, using the Consumer Price Index.

Additional Nonresident Expenditures

Nonresident anglers spent an average \$584 per angler in the 1996-97 season on goods and services not directly related to angling (Table 24). Nonresident archery deer hunters had the least additional expenditures of the season, averaging \$191 per hunter. However, nonresident archery antelope hunters also spent the smallest total direct expenditures (\$24,000). Additional expenditures increased from 1990 to 1996 for each activity (Table 25). Nonresident archery antelope hunters' additional expenditures increased by 96 percent from 1990 to 1996.

Table 24. Average Additional^a Expenditures per Hunter/angler and Additional Total Direct Expenditures for All Hunters/anglers, 1996-97

Activity	Average Additional Expenditures Per Hunter/Angler	Additional Total Direct Expenditures For All Hunters/Anglers
----- dollars -----		
Archery Antelope	284	24,000
Archery Deer	191	129,000
Firearms Deer	NA	NA
Small Game	NA	NA
Fishing	584	10,364,000

^aItems unrelated to hunting or angling.

Table 25. Average Additional^a Expenditures per Hunter/angler for All Nonresident Hunters/anglers, by Activity, 1996 Dollars, 1990 and 1996

Activity	1990	1996	Percent Change
----- 1996 dollars -----			
Archery Antelope	145	284	96
Archery Deer	148	191	29
Firearms Deer	124	NA	NA
Small Game	107	NA	NA
Fishing	323	584	81

^aItems unrelated to hunting or angling.

Economic Impact of Resident and Nonresident Hunters/Anglers

Resident and nonresident hunters and anglers accounted for \$1,667 million in total business activity in North Dakota in 1996 (Table 26). These expenditures generated \$250 million in retail trade and \$393 million in personal income. Hunting and angling participation and expenditures supported over 21,000 jobs in North Dakota.

Table 26. Retail Trade, Personal Income, Total Business Activity, and Employment Generated by Resident and Nonresident Hunter/angler Expenditures in North Dakota, 1996-97

Group	Retail Trade	Personal Income	Total Business Activity	Secondary Employment
	-----thousand dollars-----			-----jobs-----
Residents	234,314	367,919	1,562,220	19,796
Nonresidents	<u>15,851</u>	<u>24,890</u>	<u>105,685</u>	<u>1,333</u>
Total	250,165	392,809	1,667,905	21,129

Resident and Nonresident Ruralized Expenditures

The percent of urban residents' expenditures in rural areas in North Dakota ranged from 19 percent for gratis spring turkey hunters to 61 percent for special big game hunters (Table 27). The seasonal amount spent per hunter/angler ranged from \$16 for gratis fall wild turkey hunters to \$1,167 for archery antelope hunters. About \$117 million of urban resident expenditures was "ruralized" (spent in rural communities with populations less than 2,500). Ruralized urban expenditures accounted for about 20 percent of total direct resident hunter/angler expenditures.

The percentage of nonresident expenditures in rural areas in North Dakota ranged from 66 percent for firearms deer hunters to 78 percent for small game hunters (Table 28). The seasonal amount spent per hunter/angler ranged from \$306 for firearms deer hunters to \$849 for anglers. Nonresidents spent \$26 million (76 percent) of total nonresident direct expenditures in rural areas of North Dakota in the 1996-97 season.

Table 27. Urban Resident Hunter and Angler Expenditures in Rural Areas in North Dakota, by Activity, 1996-97

Activity	Ruralized Spending	Urban Participants	Seasonal Amount per Hunter/Angler	Amount all Hunters/Anglers
	-----%----		----- dollars -----	
Pronghorn Antelope				
Archery	43	627	1,167	731,000
Firearms	54	880	330	290,000
Gratis	32	54	67	4,000
Special Big Game	61	98	596	58,000
Deer				
Archery	31	5,639	520	2,931,000
Firearms	40	40,387	342	13,818,000
Gratis	50	1,148	145	167,000
Muzzleloader	31	288	187	54,000
Furbearer	59	12,873	864	11,125,000
Small Game				
Waterfowl	45	21,898	494	10,827,000
Upland	42	28,254	637	17,995,000
Wild Turkey				
Fall Turkey	42	1,503	181	272,000
Fall (Gratis)	37	12	16	
Spring Turkey ^a	47	718	331	237,000
Spring (Gratis) ^a	19	13	38	
Fishing				
Open Water	35	50,490	1,047	52,862,000
Ice	44	17,360	348	<u>6,040,000</u>
Total in Rural Areas				117,411,000

^aEstimated from fall survey.

Table 28. Nonresident Hunter and Angler Expenditures in Rural Areas in North Dakota, by Activity, 1996-97

Activity	Rural Spending	Seasonal Amount per Hunter/Angler	Amount All Hunters/Anglers
	----%----	-----dollars-----	
Pronghorn Antelope Archery	72	473	39,000
Deer Archery	75	638	430,000
Deer Firearms	66	306	278,000
Small Game	78	536	10,566,000
Fishing	74	849	<u>15,074,000</u>
Total in Rural Areas			26,387,000

Summary

Resident open water anglers had the highest average season expenditure (\$2,779) of all resident hunting/angling activities. Resident archery antelope hunters had the highest average daily expenditure (\$450), while gratis fall wild turkey hunters had the lowest average daily (\$17) and season (\$50) expenditures. The four activity groups of gratis hunters spent the least, both for the season and on a daily basis. Excluding them leaves fall turkey hunters the least for the season (\$418) and archery deer hunters spending the least for average daily expenditures (\$99).

Nonresident anglers had the highest season (\$1,122) expenditures and archery deer hunters the highest daily (\$150) expenditures of all nonresident hunters/anglers. Firearms deer hunters spent the least, on average over the nonresident season (\$466), and archery antelope hunters spent the least average per day (\$118).

Total direct resident and nonresident hunter/angler expenditures, excluding the cost of licenses and additional nonresident expenditures, came to \$578 million. Fifty-nine percent of the total direct expenditures came from angling activities. Resident hunters/anglers spent 94 percent (\$543 million) of the total direct expenditures.

Total direct resident expenditures (excluding the cost of licenses) have increased from \$151 million in 1982 to \$543 million in 1996. Nonresident expenditures have increased from \$6 million in 1976 to \$35 million in 1996.

Resident and nonresident hunters and anglers generated \$1,668 million in total business activity in North Dakota in 1996. Their expenditures accounted for \$250 million in retail trade sales, and \$393 million in personal income and supported over 21,000 jobs.

Total resident and nonresident expenditures (excluding cost of licenses and additional nonresident expenditures) were \$578 million in 1996. Over \$117 million (22 percent) of total resident expenditures were ruralized. Over \$26 million (76 percent) of total nonresident expenditures were spent in rural areas. Twenty-five percent of total resident and nonresident expenditures were spent in rural areas by nonresidents and urban residents.

Conclusions

North Dakota's resident and nonresident hunters and anglers are a vital part of the state's economy. Their expenditures represented 8 percent of the state's economic base and supported 8 percent of the state's employment in 1996. This is an increase from 1990, where resident and nonresident expenditures represented 5 percent of the state's economic base and supported 6 percent of the state's employment.

North Dakota's population experienced an 8 percent decline from 1984 to 1991. Since 1991, however, the population has increased slightly but steadily, by about 1 percent per year (Figure 10). The percentage of the population who are hunters and anglers has also increased since 1991, along with license sales (Figures 11, 12, and 13). These increases in population, percentages of hunters/anglers, and license sales may account for the increase in overall expenditures of hunters and anglers between 1991 and 1996.

Nonresident hunting and fishing license sales are on the increase as well. Fishing license sales experienced a 29 percent increase from 1991-1996, and hunting license sales experienced an 88 percent increase. The rise in both resident and nonresident license sales suggest that hunting and angling in North Dakota are regaining their popularity.

Fishing license sales have not reached the level that was achieved in 1982, when both resident and nonresident sales peaked. Although licensed hunters (residents and nonresidents) are at their highest during this period there may still be some hunting/fishing capacity available for further increases in activity for some sportsmen groups. Continued increases in hunting and angling and thus hunting/angling expenditures can further help to increase economic activity in North Dakota. The major benefactors of this increase in activity would be rural residents, especially since nonresidents make most of their expenditures related to hunting/angling in rural areas.

The responsibility of the North Dakota Game and Fish Department is to manage the state's fish and wildlife resources. This involves meeting the growing demands of resident hunters and anglers. Previous research has found that a considerable number of resident hunters and anglers would hunt elsewhere if North Dakota could not provide adequate hunting and fishing opportunities (Leitch and Baltezore 1993). NDGF should focus on keeping resident hunting and angling in the state to maintain and diversify the state's economic base. A secondary consideration should be to identify any excess capacity which could provide hunting and angling opportunities for nonresident hunters and anglers. Nonresident hunters and anglers are important participants in expanding the state's economic base and are responsible for bringing new wealth to the state and its rural areas.

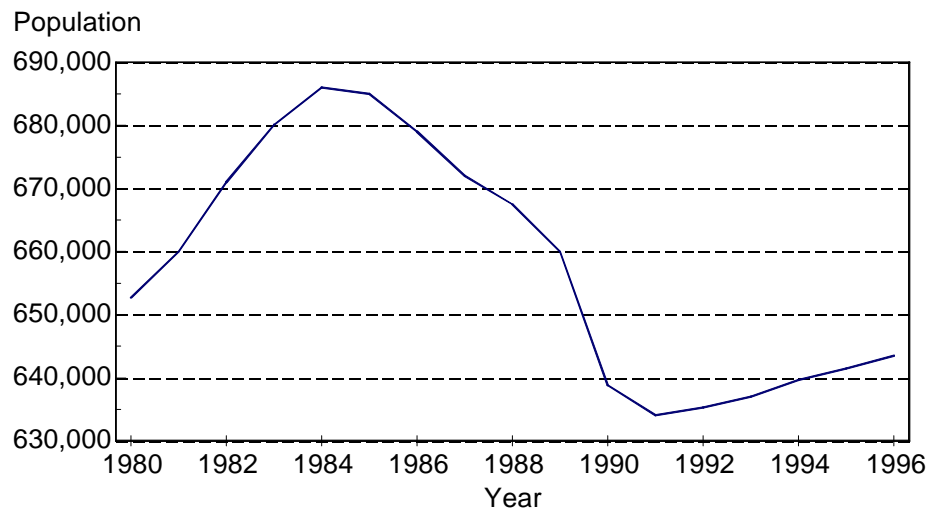


Figure 10. North Dakota Population, 1980-1996.
Source: North Dakota State Data Center

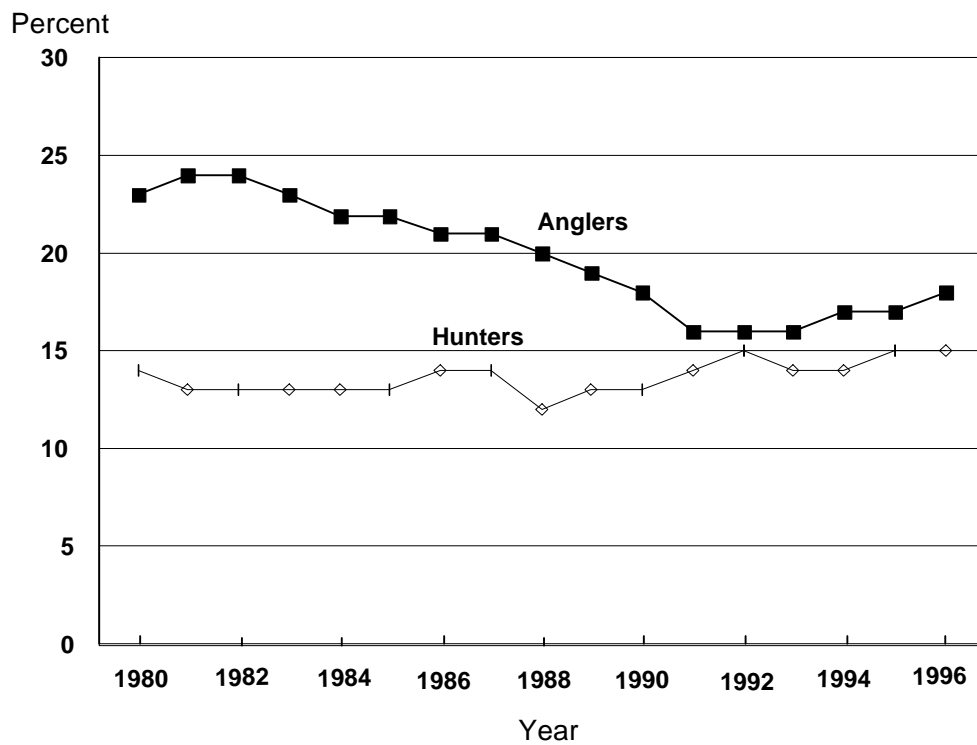


Figure 11. Percentage of North Dakota population who are hunters/anglers, 1980-1996.

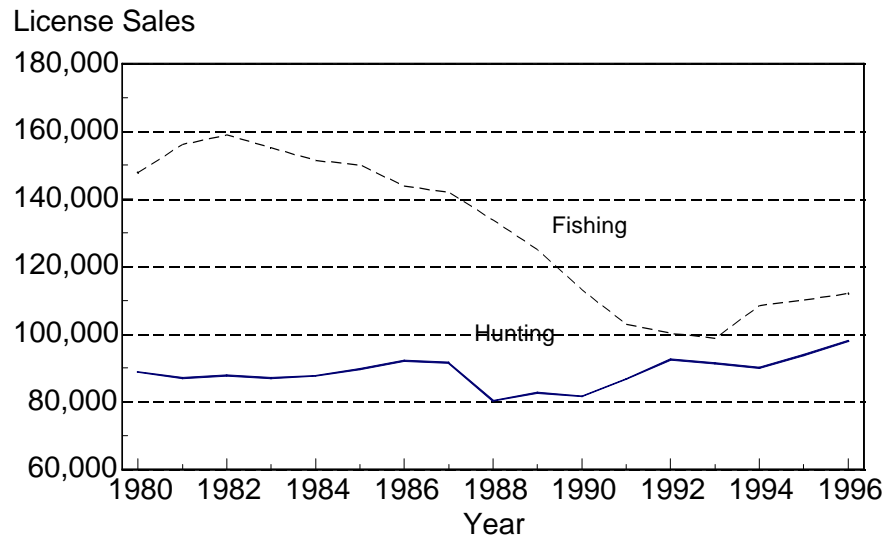


Figure 12. North Dakota resident hunting/fishing license sales, 1980-1996.

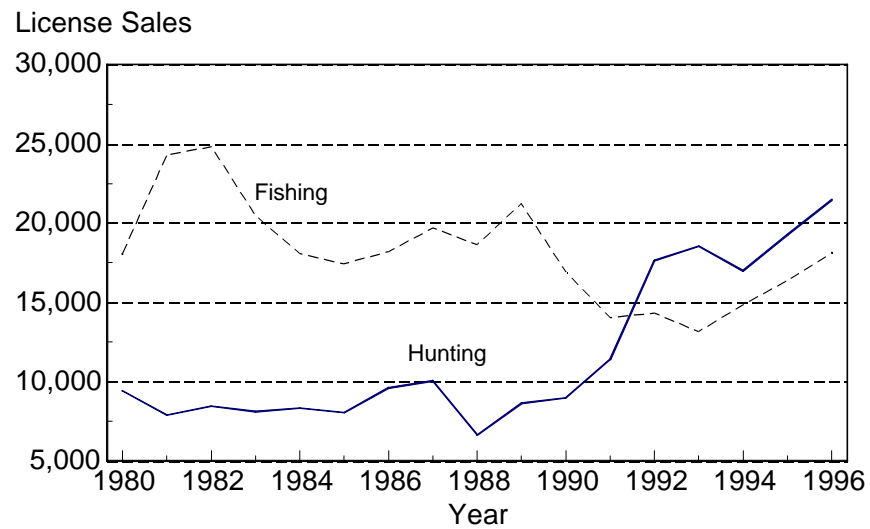


Figure 13. North Dakota nonresident hunting/fishing license sales, 1980-1996.

References

- Anderson, Randall S., and Jay A. Leitch. 1984. *Characteristics and Expenditures of Nonresident Sportsman in North Dakota in 1983*. Ag. Econ. Misc. Rpt. No. 77. Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University, Fargo.
- Baltezore, James F., Jay A. Leitch, Theresa Golz, and Arlen K. Harmoning. 1987. *Resident Hunter and Angler Expenditures and Characteristics in North Dakota in 1986*. Staff Paper AE87008, Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University, Fargo.
- Baltezore, James F., and Jay A. Leitch. 1992. *Characteristics, Expenditures, and Economics Impact of Resident and Nonresident Hunters and Anglers in North Dakota, 1990-91 Season*. Staff Paper AE92003, Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University, Fargo.
- Coon, Randall C., Theresa K. Golz, and Jay A. Leitch. 1990. *Expanding the North Dakota Input-Output Model to Include Recreation and Tourism*. Ag. Econ. Rpt. No. 255. Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University, Fargo.
- Coon, Randall, C., JoAnn M. Thompson, and Larry F. Leistritz. 1995. *The State of North Dakota: Economics, Demographics, Public Service, and Fiscal Conditions: A Presentation of Selected Indicators*. Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University, Fargo.
- Kerestes, Daniel E., and Jay A. Leitch. 1983. *An Analysis of Sportsman Activity Data Collection Methods for North Dakota*. Ag. Econ. Rpt. No. 180. Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University, Fargo.
- Leistritz, F. Larry, and Randall C. Coon. 1990. *The Changing Composition of North Dakota's Economic Base*. Ag. Econ. Statistical Series Rpt. No. 48, Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University, Fargo.
- Leitch, Jay A., and James F. Baltezore. 1983. "The Hunt for Economic Development." *North Dakota Farm Research* 49(6):13-17.
- Leitch, Jay A., and Daniel E. Kerestes. 1982. *Development and Implementation of a Periodic Data Collection System for Game and Fish Management and Policy Analysis: First Year Report--Summary Data and Preliminary Findings*. Staff Paper AE82017, Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University, Fargo.

Leitch, Jay A., and Donald F. Scott. 1978. *Nonresident Hunters in North Dakota: Characteristics, Expenditures, Harvest*. Ag. Econ. Rpt. No. 126, Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University, Fargo.

Appendix A

Representative Questionnaire

Appendix B

Summary of Expenditures

**Appendix
Table**

Page

B1	Resident Archery Pronghorn Antelope	49
B2	Resident Firearms Pronghorn Antelope	50
B3	Gratis Pronghorn Antelope	51
B4	Special Big Game	52
B5	Resident Archery Deer	53
B6	Resident Firearms Deer	54
B7	Resident Muzzleloader Deer	55
B8	Gratis Deer	56
B9	Resident Furbearer	57
B10	Resident Waterfowl	58
B11	Resident Upland Game	59
B12	Resident Fall Wild Turkey	60
B13	Resident Spring Wild Turkey	61
B14	Gratis Wild Turkey	62
B15	Resident Open Water Fishing	63
B16	Resident Ice Fishing	64
B17	Nonresident Archery Pronghorn Antelope	65
B18	Nonresident Archery Deer	66
B19	Nonresident Firearms Deer	67
B20	Nonresident Small Game	68
B21	Nonresident Fishing	69

Resident Archery Pronghorn Antelope

Appendix Table B1. Resident archery pronghorn antelope hunter expenditures, 1996.

Expenditure Category ^a	Mean		
	- dollars -		
Variable:			
Access	0.33		
Film	3.70		
Food	63.05		
Guide	0.41		
Lodging	13.57		
Meat	5.40		
Other	6.46		
Taxidermy	9.56		
Transportation	125.33		
Season	227.81	$\pm 19.18^b$	(n=365; sd=223.42)
Daily	48.35	± 4.26	(n=360; sd=49.24)
Fixed:			
Binoculars	54.73		
Camping	45.28		
Clothing	56.09		
Other	12.51		
Vehicle	1210.63		
Weapons	134.47		
Season	1513.71	± 436.97	(n=335; sd=4876.74)
Daily	397.33	± 190.23	(n=330; sd=2107.16)
Total Fixed and Variable:			
Season	1777.00	± 457.00	(n=327; sd=4974.58)
Daily	450.11	± 195.31	(n=327; sd=2131.54)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Firearms Pronghorn Antelope

Appendix Table B2. Resident firearms pronghorn antelope hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	0.16	
Ammunition	12.97	
Film	2.98	
Food	47.43	
Guide	0.15	
Lodging	26.60	
Meat	23.93	
Other	3.75	
Taxidermy	23.05	
Transportation	74.65	
Season	214.77	$\pm 8.83^b$ (n=999; sd=170.18)
Daily	124.34	± 6.50 (n=999; sd=125.29)
Fixed:		
Binoculars	20.64	
Camping	7.06	
Clothing	18.53	
Other	2.44	
Vehicle	352.25	
Weapons	34.4	
Season	420.98	± 139.52 (n=994; sd=2682.26)
Daily	257.56	± 99.71 (n=994; sd=1916.92)
Total Fixed and Variable:		
Season	623.00	± 137.00 (n=988; sd=2720.83)
Daily	386.58	± 102.60 (n=988; sd=1947.21)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Gratis Pronghorn Antelope

Appendix Table B3. Gratis pronghorn antelope hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	0	
Ammunition	5.09	
Film	0.28	
Food	5.61	
Guide	0	
Lodging	0	
Meat	12.65	
Other	0.49	
Taxidermy	7.61	
Transportation	13.84	
Season	46.42	± 11.09 ^b (n=200; sd=95.62)
Daily	28.96	± 8.47 (n=200; sd=73.05)
Fixed:		
Binoculars	9.53	
Camping	1.46	
Clothing	8.50	
Other	2.70	
Vehicle	15.93	
Weapons	31.50	
Season	69.88	± 34.72 (n=200; sd=299.41)
Daily	39.15	± 19.77 (n=200; sd=170.48)
Total Fixed and Variable:		
Season	117.08	± 38.08 (n=197; sd=333.64)
Daily	70.15	± 23.95 (n=197; sd=204.95)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Special Big Game

Appendix Table B4. Special big game hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	17.12	
Ammunition	16.16	
Film	10.25	
Food	109.62	
Guide	11.30	
Lodging	71.91	
Meat	78.09	
Other	19.42	
Taxidermy	134.71	
Transportation	151.73	
Season	615.55	$\pm 60.94^b$ (n=144; sd=445.92)
Daily	242.31	± 45.54 (n=144; sd=333.22)
Fixed:		
Binoculars	28.65	
Camping	16.00	
Clothing	34.35	
Other	16.31	
Vehicle	232.93	
Weapons	44.25	
Season	365.71	± 251.25 (n=144; sd=1838.45)
Daily	61.56	± 26.41 (n=144; sd=193.28)
Total Fixed and Variable:		
Season	975.81	± 260.61 (n=143; sd=1907.59)
Daily	325.15	± 72.03 (n=143; sd=415.88)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Archery Deer

Appendix Table B5. Resident archery deer hunter expenditures, 1996.

Expenditure Category ^a	Mean	
- dollars -		
Variable:		
Access	1.56	
Film	4.84	
Food	64.92	
Guide	0.02	
Lodging	6.58	
Meat	32.08	
Other	9.05	
Taxidermy	19.90	
Transportation	129.39	
Season	268.33	$\pm 22.60^b$ (n=599; sd=337.35)
Daily	26.34	± 3.45 (n=582; sd=50.72)
Fixed:		
Binoculars	32.05	
Camping	20.54	
Clothing	62.92	
Other	16.56	
Vehicle	737.80	
Weapons	113.34	
Season	983.22	± 274.57 (n=551; sd=3930.01)
Daily	72.18	± 22.72 (n=537; sd=321.08)
Total Fixed and Variable:		
Season	1270.00	± 288.00 (n=527; sd=4117.96)
Daily	98.54	± 23.56 (n=527; sd=329.73)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Firearms Deer

Appendix Table B6. Resident firearms deer hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	0.19	
Ammunition	16.99	
Film	1.78	
Food	40.12	
Guide	0.50	
Lodging	7.44	
Meat	48.53	
Other	1.94	
Taxidermy	6.04	
Transportation	63.75	
Season	195.74	$\pm 15.84^b$ (n=540; sd=224.46)
Daily	58.60	± 4.58 (n=540; sd=64.85)
Fixed:		
Binoculars	17.56	
Camping	0.94	
Clothing	30.01	
Other	3.98	
Vehicle	343.64	
Weapons	44.42	
Season	444.09	± 187.42 (n=543; sd=2662.99)
Daily	117.23	± 51.87 (n=543; sd=737.05)
Total Fixed and Variable:		
Season	631.88	± 186.85 (n=540; sd=2364.23)
Daily	174.42	± 51.97 (n=540; sd=722.16)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Muzzleloader Deer

Appendix Table B7. Resident muzzleloader deer hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	1.04	
Ammunition	13.27	
Film	0.96	
Food	20.48	
Guide	0.11	
Lodging	1.85	
Meat	13.18	
Other	2.21	
Taxidermy	6.62	
Transportation	48.81	
Season	108.75	$\pm 9.88^b$ (n=460; sd=129.22)
Daily	36.79	± 4.06 (n=460; sd=53.11)
Fixed:		
Binoculars	24.68	
Camping	7.38	
Clothing	29.75	
Other	12.63	
Vehicle	940.22	
Weapons	71.46	
Season	1089.70	± 450.31 (n=323; sd=4934.75)
Daily	406.40	± 199.94 (n=323; sd=2191.06)
Total Fixed and Variable:		
Season	1167.97	± 454.14 (n=319; sd=4989.45)
Daily	442.14	± 205.22 (n=319; sd=2213.24)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Gratis Deer

Appendix Table B8. Gratis deer hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	0	
Ammunition	11.71	
Film	0.47	
Food	12.65	
Guide	0	
Lodging	0	
Meat	64.35	
Other	1.18	
Taxidermy	8.38	
Transportation	23.88	
Season	127.78	$\pm 37.69^b$ (n=32; sd=130.01)
Daily	53.10	± 18.39 (n=32; sd=63.44)
Fixed:		
Binoculars	0	
Camping	0	
Clothing	7.32	
Other	1.18	
Vehicle	0	
Weapons	59.56	
Season	68.06	± 48.77 (n=34; sd=173.42)
Daily	30.28	± 26.32 (n=34; sd=93.59)
Total Fixed and Variable:		
Season	201.09	± 72.70 (n=32; sd=236.96)
Daily	82.28	± 34.69 (n=32; sd=116.22)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Furbearer

Appendix Table B9. Resident furbearer hunter/trapper expenditures, 1996.

Expenditure Category ^a	Mean	
- dollars -		
Variable:		
Access	0.05	
Ammunition	22.16	
Film	1.74	
Food	37.71	
Guide	0	
Lodging	5.06	
Other	4.40	
Taxidermy	6.27	
Transportation	111.98	
Season	189.81	± 22.78 ^b (n=882; sd=412.52)
Daily	26.52	± 2.52 (n=754; sd=42.23)
Fixed:		
Binoculars	49.20	
Calls	7.27	
Camping	13.03	
Clothing	41.69	
Other	4.21	
Skinning Equipment	5.69	
Traps	13.82	
Vehicle	604.54	
Weapons	114.61	
Season	856.54	± 197.49 (n=692; sd=3167.79)
Daily	189.07	± 68.02 (n=573; sd=992.81)
Total Fixed and Variable:		
Season	1215.28	± 232.13 (n=570; sd=3466.68)
Daily	219.81	± 68.69 (n=570; sd=999.92)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Waterfowl

Appendix Table B10. Resident waterfowl hunter expenditures, 1996.

Expenditure Category ^a	Mean	
- dollars -		
Variable:		
Access	1.13	
Ammunition	71.43	
Film	4.15	
Food	67.46	
Guide	0.05	
Lodging	17.90	
Meat	8.28	
Other	3.64	
Taxidermy	14.71	
Transportation	135.82	
Veterinarian	12.13	
Season	353.83	± 33.32 ^b (n=381; sd=396.58)
Daily	57.12	± 6.94 (n=361; sd=80.43)
Fixed:		
Binoculars	22.69	
Boat	20.84	
Camping	7.69	
Clothing	69.71	
Decoys	30.58	
Dogs	10.14	
Other	2.02	
Vehicle	596.70	
Weapons	91.06	
Season	851.38	± 366.55 (n=379; sd=4351.16)
Daily	225.84	± 163.33 (n=359; sd=1886.98)
Total Fixed and Variable:		
Season	1225.99	± 416.97 (n=358; sd=4476.12)
Daily	192.63	± 71.17 (n=358; sd=1917.15)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Upland Game

Appendix Table B11. Resident upland game hunter expenditures, 1996.

Expenditure Category ^a	Mean	
- dollars -		
Variable:		
Access	2.08	
Ammunition	50.95	
Film	5.45	
Food	88.08	
Guide	2.64	
Lodging	24.43	
Meat	19.13	
Other	4.0	
Taxidermy	15.54	
Transportation	169.28	
Veterinarian	17.71	
Season	399.26	± 41.08 ^b (n=568; sd=597.06)
Daily	57.27	± 6.36 (n=439; sd=81.31)
Fixed:		
Binoculars	17.46	
Camping	14.69	
Clothing	51.51	
Dogs	10.54	
Other	5.98	
Vehicle	704.84	
Weapons	79.82	
Season	884.86	± 262.45 (n=568; sd=3814.04)
Daily	163.12	± 80.56 (n=439; sd=1029.25)
Total Fixed and Variable:		
Season	1289.12	± 277.06 (n=439; sd=3833.52)
Daily	246.40	± 81.55 (n=439; sd=1041.87)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Fall Wild Turkey

Appendix Table B12. Resident fall wild turkey hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	0.72	
Ammunition	7.63	
Film	1.39	
Food	23.65	
Guide	0.02	
Lodging	9.32	
Meat	0.76	
Other	1.47	
Taxidermy	1.32	
Transportation	38.54	
Season	84.95	$\pm 4.70^b$ (n=1469; sd=109.76)
Daily	48.12	± 2.67 (n=1469; sd=62.45)
Fixed:		
Binoculars	8.02	
Camping	1.67	
Clothing	14.46	
Other	2.04	
Vehicle	296.02	
Weapons	24.61	
Season	331.93	± 111.96 (n=1458; sd=2606.84)
Daily	215.67	± 81.65 (n=1458; sd=1901.09)
Total Fixed and Variable:		
Season	418.12	± 115.79 (n=1457; sd=2625.13)
Daily	263.08	± 84.10 (n=1457; sd=1910.79)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Spring Wild Turkey

Appendix Table B13. Resident spring wild turkey hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	11.11	
Ammunition	9.5	
Film	5.92	
Food	25.74	
Lodging	43.98	
Meat	8.8	
Other	35.55	
Taxidermy	90.25	
Transportation	45.52	
Season	106.04	$\pm 7.86^b$ (n=315; sd=85.06)
Daily	59.72	± 6.02 (n=315; sd=65.17)
Fixed:		
Binoculars	109.09	
Camping	55.11	
Clothing	54.68	
Other	31.29	
Vehicle	6807.73	
Weapons	275.96	
Season	589.18	± 296.77 (n=315; sd=3211.69)
Daily	389.46	± 229.71 (n=315; sd=2485.95)
Total Fixed and Variable:		
Season	705.22	± 303.56 (n=315; sd=3209.36)
Daily	359.18	± 201.04 (n=315; sd=2489.57)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Gratis Wild Turkey

Appendix Table B14. Gratis wild turkey hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	0	
Ammunition	6.5	
Film	0.06	
Food	7.15	
Guide	0	
Lodging	0	
Meat	0.44	
Other	0	
Taxidermy	0	
Transportation	18.86	
Season	32.12	$\pm 12.57^b$ (n=60; sd=59.36)
Daily	11.12	± 3.64 (n=60; sd=17.22)
Fixed:		
Binoculars	2.62	
Camping	0.79	
Clothing	9.82	
Other	0.60	
Vehicle	0	
Weapons	2.38	
Season	17.32	± 12.14 (n=59; sd=56.87)
Daily	5.95	± 3.68 (n=59; sd=17.22)
Total Fixed and Variable:		
Season	49.76	± 22.22 (n=59; sd=99.40)
Daily	17.15	± 5.50 (n=59; sd=25.78)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Open Water Fishing

Appendix Table B15. Resident summer angler expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	6.47	
Bait	39.22	
Boat / fish house gas	66.12	
Boat / fish house rental	3.06	
Film	7.45	
Food	128.71	
Lodging	36.64	
Meat	2.70	
Other	10.80	
Repairs	57.29	
Taxidermy	5.33	
Transportation	161.88	
Season	519.99	± 28.34 ^b (n=1693; sd=711.00)
Daily	38.17	± 2.18 (n=1669; sd=54.40)
Fixed:		
Boat	659.07	
Camping	91.09	
Clothing	47.52	
Depth Finder	30.20	
Other	15.44	
Rods	59.10	
Tackle	54.52	
Vehicle	1102.88	
Season	1900.18	± 260.70 (n=1559; sd=6276.58)
Daily	173.61	± 30.97 (n=1535; sd=739.87)
Total Fixed and Variable:		
Season	2779.32	± 351.56 (n=1497; sd=6642.54)
Daily	229.93	± 35.42 (n=1497; sd=764.79)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Resident Ice Fishing

Appendix Table B16. Resident ice angler expenditures, 1996.

Expenditure Category ^a	Mean	
- dollars -		
Variable:		
Bait	19.73	
Fish house heater fuel	10.93	
Fish house rental	2.71	
Film	1.39	
Food	55.67	
Lodging	6.51	
Meat	1.55	
Other	4.45	
Repairs	12.19	
Taxidermy	4.26	
Transportation	88.32	
Season	207.93	± 22.39 ^b (n=617; sd=339.20)
Daily	28.78	± 5.39 (n=616; sd=81.53)
Fixed:		
Auger	36.86	
Clothing	29.48	
Depth Finder	16.22	
Fish House	41.86	
Other	7.41	
Rods	22.93	
Tackle	23.45	
Vehicle	575.65	
Season	753.89	± 239.59 (n=476; sd=3187.29)
Daily	94.22	± 38.59 (n=475; sd=512.90)
Total Fixed and Variable:		
Season	1011.39	± 252.96 (n=469; sd=3274.35)
Daily	121.26	± 39.30 (n=469; sd=518.91)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Nonresident Archery Pronghorn Antelope

Appendix Table B17. Nonresident archery pronghorn antelope hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	31.58	
Film	7.84	
Food	147.89	
Guide	0	
Lodging	53.95	
Meat	13.68	
Other	38.00	
Taxidermy	29.47	
Transportation	181.32	
Season	503.74	± 102.83 ^b (n=19; sd=273.31)
Daily	85.25	± 18.76 (n=19; sd=49.87)
Fixed:		
Binoculars	17.86	
Camping	17.64	
Clothing	30.86	
Other	57.86	
Vehicle	0	
Weapons	3.57	
Season	127.78	± 89.02 (n=14; sd=203.11)
Daily	22.75	± 17.28 (n=14; sd=39.42)
Total Fixed and Variable:		
Season	685.36	± 165.58 (n=14; sd=375.48)
Daily	118.25	± 32.46 (n=14; sd=71.78)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Nonresident Archery Deer

Appendix Table B18. Nonresident archery deer hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	86.73	
Film	7.92	
Food	134.99	
Guide	65.10	
Lodging	91.17	
Meat	9.83	
Other	42.00	
Taxidermy	11.37	
Transportation	157.88	
Season	607.00	$\pm 40.81^b$ (n=384; sd=487.68)
Daily	102.14	± 9.52 (n=379; sd=112.99)
Fixed:		
Binoculars	5.47	
Camping	9.90	
Clothing	37.77	
Other	16.63	
Vehicle	244.51	
Weapons	15.76	
Season	330.05	± 249.02 (n=257; sd=2434.23)
Daily	50.22	± 40.01 (n=252; sd=387.29)
Total Fixed and Variable:		
Season	956.58	± 262.73 (n=251; sd=2547.76)
Daily	149.50	± 43.26 (n=251; sd=408.30)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Nonresident Firearms Deer

Appendix Table B19. Nonresident firearms deer hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	0.64	
Ammunition	13.87	
Film	3.29	
Food	109.82	
Guide	3.21	
Lodging	33.38	
Meat	36.46	
Other	25.61	
Taxidermy	7.91	
Transportation	138.08	
Season	372.85	$\pm 27.26^b$ (n=420; sd=340.65)
Daily	121.10	± 10.45 (n=420; sd=130.64)
Fixed:		
Binoculars	6.23	
Camping	6.94	
Clothing	20.61	
Other	5.23	
Vehicle	26.00	
Weapons	25.73	
Season	71.10	± 23.28 (n=420; sd=290.92)
Daily	22.13	± 8.15 (n=420; sd=101.85)
Total Fixed and Variable:		
Season	465.95	± 49.43 (n=420; sd=467.80)
Daily	145.23	± 13.58 (n=420; sd=169.77)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Nonresident Small Game

Appendix Table B20. Nonresident small game hunter expenditures, 1996.

Expenditure Category ^a	Mean	
	- dollars -	
Variable:		
Access	7.49	
Ammunition	36.01	
Film	4.70	
Food	149.70	
Guide	40.66	
Lodging	125.05	
Meat	4.59	
Other	20.53	
Taxidermy	7.63	
Transportation	157.90	
Veterinarian	5.61	
Season	575.37	± 22.56 ^b (n=1232; sd=482.77)
Daily	68.39	± 3.98 (n=655; sd=62.20)
Fixed:		
Binoculars	1.33	
Camping	2.19	
Clothing	24.78	
Dogs	0.21	
Other	6.61	
Vehicle	26.42	
Weapons	15.18	
Season	84.62	± 40.85 (n=752; sd=683.10)
Daily	11.14	± 6.04 (n=425; sd=75.92)
Total Fixed and Variable:		
Season	704.64	± 54.59 (n=423; sd=1123.54)
Daily	131.05	± 9.14 (n=423; sd=102.13)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Nonresident Fishing

Appendix Table B21. Nonresident angler expenditures, 1996.

Expenditure Category ^a	Mean	
- dollars -		
Variable:		
Access	2.26	
Bait	23.61	
Boat / fish house gas	33.99	
Boat / fish house rental	5.71	
Film	4.93	
Food	136.15	
Lodging	75.88	
Meat	1.06	
Other	13.98	
Repairs	18.19	
Taxidermy	3.17	
Transportation	143.79	
Season	470.16	± 36.91 ^b (n=562; sd=533.48)
Daily	83.70	± 7.14 (n=560; sd=102.99)
Fixed:		
Auger	7.05	
Boat	394.08	
Camping	9.99	
Clothing	10.78	
Depth Finder	11.04	
Fish House	0	
Other	6.15	
Rods	25.27	
Tackle	37.42	
Vehicle	314.99	
Season	817.26	± 330.19 (n=315; sd=3573.31)
Daily	84.76	± 56.16 (n=313; sd=605.81)
Total Fixed and Variable:		
Season	1122.31	± 251.73 (n=306; sd=3826.35)
Daily	252.08	± 35.03 (n=306; sd=619.01)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.